

# **WATER STRATEGY 2019-2022**





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## Acronyms and Initials

<b>ADERASA</b>	Asociación de entes reguladores de agua y saneamiento de las Américas [Association of water and sanitation regulatory agencies of the Americas]
<b>ECLAC</b>	UN Economic Commission for Latin America and the Caribbean
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>GDP</b>	Gross Domestic Product
<b>GWI</b>	Global Water Intelligence
<b>GWP</b>	Global Water Partnership
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IWRM</b>	Integrated Water Resources Management
<b>JMP</b>	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene
<b>LAC</b>	Latin America and the Caribbean
<b>MINAM</b>	Ministry of the Environment
<b>MOOC</b>	Massive Open Online Course
<b>MPI</b>	Multidimensional Poverty Index
<b>MW</b>	Megawatts
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PSP</b>	Panama Sanitation Program
<b>SDG</b>	Sustainable Development Goal
<b>SIWI</b>	Stockholm International Water Institute
<b>UBN</b>	Unsatisfied Basic Needs
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNEP</b>	United Nations Environment Programme
<b>UN Habitat</b>	United Nations Human Settlements Programme
<b>UNISDR</b>	United Nations Office for Disaster Risk Reduction
<b>WB</b>	World Bank
<b>WDI</b>	World Development Indicators
<b>WHO</b>	World Health Organization
<b>WWAP</b>	World Water Assessment Programme
<b>WWC</b>	World Water Council
<b>WWTP</b>	Wastewater Treatment Plant

## Prologue

The definition of the Sustainable Development Goals (SDG) system is the result of a profound reflection based on multiple guiding principles, among them, the interdependence and complementarity between the 17 goals and their respective targets. In this regard, the system highlights the direct and indirect impact that the use and sustainable management of water resources has on several targets. Water resource management has implications for economic and social development, health, food production, access to decent housing, energy security, among many others, with multiplier effects in various areas of human development, linked to education, employment and gender equity.

Considering that Latin America and the Caribbean could well be called “Blue Continent”, given its privileged abundance of this resource, it could be argued that the region is in an advantageous position to address the sustainable development agenda. However, decreasing water availability, increasing droughts and desertification affect every continent. Several studies report that one in four people in the world will be affected by periodic water shortages by 2050. In areas of climate vulnerability, water availability is increasingly compromised in terms of quality and quantity. Likewise, access to quality water is often threatened by the deterioration of sources and aquifer pollution, a phenomenon that exposes the population to risks and water-related diseases. Additionally, the availability of water is affected by the resource’s asymmetric distribution, which demands complex governance efforts and hefty investments to ensure its sustainable provision for human consumption, agricultural and industrial production, and the preservation of ecosystems.

It is important to highlight the significant progress in coverage achieved in Latin America and the Caribbean in recent years. Today, more than 149 million Latin Americans have access to drinking water and sanitation services. Despite this progress, 21 million people still do not have access to basic drinking water services and 83 million do not have acceptable sanitation. These figures may be even higher if we consider that access to water must be safe, permanent, sufficient, and of good quality. Sanitation services should include treatment and safe disposal. Regarding the latter, it is estimated that about two-thirds of the wastewater that is collected by sewage systems in the region is not treated properly. This scenario urges the region to redouble concrete efforts and actions in the short and medium term, prioritizing not only the planning of more and better investments, but the strengthening of governance and management of services.

Aware of the timeliness and opportunity to favor a relevant and integral management of water resources to ensure Latin America’s sustainable development, CAF presents its renewed Water Strategy 2019-2022. This strategy is framed by the guiding concept of water security, devised under the premise of supporting the region’s efforts to bridge gaps in favor of universal access to drinking water and sanitation, contributing to economic and social development, reducing aquifer pollution, protecting the environment, and strengthening supply and demand capacities for a more efficient and equitable use of water.

The strategic objectives set out in this document are interrelated. They guide CAF’s growing support for resilient water infrastructure. Under the framework of



Integrated Water Resources Management, CAF is strongly committed to assisting the countries in the region to improve their institutional structure and capacity for planning, execution and management of water services, sanitation and irrigation, while being better prepared to face and reduce the increasing risks of droughts and floods.

CAF's Water Strategy 2019-2022 is not static. On the contrary, it should be understood as a dynamic proposal that will be nurtured based on an ongoing dialogue with different regional actors, as well as reflections that result from debate by the international community, an area in which CAF is increasingly present.

The launch of CAF's Water Strategy 2019-2022 coincides with the year in which the UN-Water has pledged to "Leave No One behind," in its commitment to universal access to safe water. This is precisely the commitment that CAF ratifies with this proposal.

**Julián Suárez Migliozi**

Vice-president of Sustainable Development, CAF

## Executive Summary

The Latin American and Caribbean region (LAC) made significant progress in the water sector, increasing water coverage from 90% in 2000 to 97% in 2017, and sanitation coverage from 73% to 87% in the same term. As a result, more than 149 million inhabitants gained access to water services and more than 176 million to sanitation. LAC occupies a strategic position in the global context, with about 30% of world water resources and high irrigation potential. This is essential for food security in the region and to meet the demand for exports to other continents. The region increased its share in world agri-food exports from 8.3% in 1990 to 13.8% in 2015. There is a high potential for hydropower generation in LAC, which is currently using 25% of its potential.

That said, 21 million people still do not have basic access to drinking water and more than 116 million receive it under insufficient conditions of continuity or sanitary quality. Eighty-three million people do not have basic access to sanitation and nearly 75 million who live in urban areas do not have wastewater discharges into the sanitary sewer, with a high probability that they are polluting the aquifers. This is an additional problem to insufficient wastewater treatment, which is estimated at around 30%. This situation requires not only an increase in financing for water and sanitation, but also substantially improving capacity and quality in service provision as well as ensuring their technical, financial and environmental sustainability.

Water resources are abundant, but are distributed in a heterogeneous way, resulting in increasing competition for water among different users. Irrigation uses more than 70% of the water demand and projections indicate an increase in use according to future demands of water for agriculture and human consumption due to population growth in the region. This situation calls for the initiation or consolidation of integrated water resources management to organize, prioritize and mitigate potential conflicts pertaining to the use of water. Population growth also drives the expansion of feasible irrigation projects and establish adequate water reserves for current and future human consumption in an environmentally sustainable manner. Water management should also consider that the region is highly vulnerable to the effects of variability and climate change, with more severe droughts and the intensification of flood events, which in the last 15 years have increased by more than 40% compared to an earlier similar period.

CAF deems it necessary to establish a water strategy that will guide its support for member countries in line with the Sustainable Development Goals and international agreements and conventions, based on the premise of advancing and consolidating water security in LAC. With this in mind, CAF's sectoral strategic objective is **to promote access to safe drinking water and sanitation for the population, and to contribute to the productivity of countries through the efficient use of water, as well as reducing water pollution, preserving ecosystems, and protecting against disasters related to water scarcity or surplus**. For this purpose, the following specific objectives have been defined:

1. **Safe, efficient and sustainable access to water and sanitation services** through actions that contribute to both universal and safe access to urban services and to reducing the gap in access to water and sanitation in rural areas.
2. **Reducing water pollution and preserving ecosystems** by reducing the wastewater treatment deficit and restoring water body quality, promoting reuse and use of treatment by-products.
3. **Efficient and affordable access to rural irrigation services for family agriculture** contributing to the expansion and rehabilitation of efficient irrigation systems, in favor of better access to family farming, in order to increase income among vulnerable segments of the rural population and drive productivity improvements as the foundation of a comprehensive rural development strategy.
4. **Multi-sectoral development of water for agribusiness and other productive uses**, contributing to the construction, expansion and rehabilitation of irrigation systems and production chains to boost productivity gains and promote inter-sector dynamics, as well as the promotion of multisectoral initiatives for socio-economic development.
5. **Improved governance and sustainable management of water resources**, aimed at promoting structural and non-structural measures, including the consolidation of policies, plans and procedures for integrated water management; strengthening institutional structure and management tools with participatory mechanisms in a way that provides greater transparency and better accountability; financing of infrastructure and systems to adapt to climate change, preserve ecosystems, and reduce risks from water-related disasters.

The strategy guides CAF's operations and technical cooperation toward greater integration and synergy between program lines to deliver greater benefits with a large-scale impact in the region. Several instruments and tools feed these program lines. They include:

- a. Financing through loans, guarantees and collaterals, credit lines, project financing, co-financing, refinancing, equity participations, among others.
- b. Pre-investment Program to support countries in the preparation of final designs and feasibility studies to reduce project duration, increase the quality of project's designs, and promote the use of cutting-edge technologies.
- c. Platforms for improving governance and financing aimed at improving the effectiveness of public policies, especially to boost the construction of wastewater treatment plants under a circular economy and through a watershed approach.
- d. Specialized advisory services aimed at complex and feasible projects from the initial project stages for better design and implementation.

- e. Knowledge documents for CAF personnel and for dissemination in member countries, including case studies and pilot projects for scaling up; applied research studies for the optimization and rehabilitation of existing systems; systematization of best practices based on assessments in the project cycle; and guidelines for the conceptualization and core aspects of project formulation.
- f. Training, to be delivered through various modalities, including massive open online courses (MOOCs) and the exchange of North-South, South-South and triangular experiences.
- g. Alliances with global and regional organizations with which CAF maintains a growing cooperation, focusing its attention on strategic issues, such as financing for wastewater treatment, water governance, institutional structures and inclusive management models to ensure service sustainability.

During the 2019-2022 period, CAF-financed projects and programs in the water sector are expected to achieve the following results:

- More than 11 million people in cities with new or improved access to drinking water service.
- Over 3.3 million people with new or improved access to sewerage services.
- More than 500,000 people in rural areas with safe water access and 50,000 with sanitation services.
- 4.5 million beneficiaries of wastewater treatment.
- 96,000 families with access to irrigation systems for small-scale agriculture.
- More than 3.5 million people who benefit from better planning under integrated water resources management (IWRM).
- Ten million people less vulnerable to disaster-risk due to droughts or flooding.



1.



# Why a CAF Water Strategy

CAF was created in 1970 as a sub-regional bank. In the last 25 years, it grew from being a bank with five Andean countries and USD 700 million in total assets to becoming an Ibero-American bank with 19 member countries (17 from Latin America, plus Spain and Portugal) and more than USD 40 billion in total assets.

CAF aims to promote sustainable development and regional integration through credit operations, non-reimbursable technical assistance to support technical and financial structuring of projects in Latin American public and private sectors.

To fulfill this mandate, CAF has expanded its portfolio significantly in favor of development with the water sector being the largest and most dynamic. The institution began its activities focusing on drinking water later, it enlarged its scope to irrigation projects for family and smallholder agriculture. In the last ten years, it has extended its support to sanitation projects, the construction of wastewater treatment plants, and irrigation projects for the promotion of agribusiness. In the last five years, it has further expanded the scope to include flood control; construction of major infrastructure, such as dams and tunnels; and projects to improve watershed management. At the end of 2018, there were more than 60 water-related credit operations in the formalization or administration stage; water, together with the road infrastructure and energy, make up the most developed sectors in CAF.

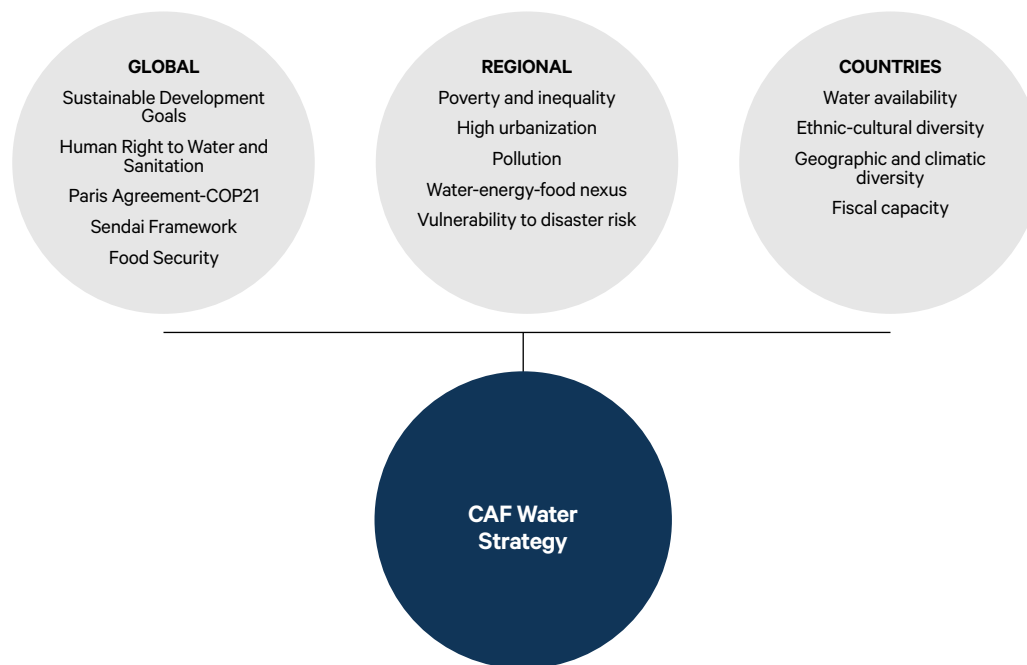
This gradual and sustained progress is proportional to the growing demands and commitments made by countries, in line with global trends that revalue water for its direct and indirect benefits. Among these commitments are the Sustainable Development Goals (SDGs), which propose to achieve, among other targets, the universality of drinking water and sanitation services and the eradication of hunger. Both were preceded by global initiatives, such as international declarations on the Human Right to Water and Sanitation (HRWS), the right to health and food security, the Sendai Framework for Disaster Risk

Reduction and the United Nations Framework Convention on Climate Change. Figure 1 illustrates the relationship between global, regional and country challenges, and CAF's water strategy.

**FIGURE 1.**

Relationship between global, regional and national challenges and CAF's strategy

Source: Authors



### Latin America and the Caribbean continue to grow economically, but also need to close inescapable gaps

**The countries of Latin America and the Caribbean (LAC) have managed to reduce poverty, but inequality in the region persists.** In the present century, the region was characterized by a continuous period of political and economic stability, with an average GDP growth of 3.48% in the period 2000-2008 and 1.79% in 2009-2017 (World Bank, 2018b). This growth was driven by a high external demand for goods and services produced in the region, as well as by greater productive diversification and significant urban growth, which has brought the regional urbanization rate to 80.5% (UN, 2017). Despite this economic growth, the levels of poverty and extreme poverty, as well as those of inequality, limit the growth and sustainable development of the countries of the region.



Since 2002, more than 45 million inhabitants moved out of poverty. The poverty rate dropped from 44.5% that year to 30.2% in 2017 and 29.6% in 2018 (ECLAC, 2019a; 2018a; 2018b). However, in 2014, the rate was 27.8%, which indicates a slight deterioration in recent years. Extreme poverty also decreased from 11.2% in 2002 to 10.2% in 2017, although its lowest level was in 2014, when it stood at 7.8% (ECLAC, 2019a).

This means that 190 million inhabitants still live in poverty and, of these, more than 60 million in extreme poverty, distributed in the different demographic strata and types of settlement, from megacities to rural territories, each with their characteristics.

São Paulo, Rio de Janeiro, Mexico, Buenos Aires, Lima and Bogota are six mega cities grouping more than 90 million people, representing 18% of the region's urban population (Figure 2). They are characterized by accelerated migratory flows and the growth of peri-urban settlements, generally lacking urban planning and basic services, as well as ownership of land tenure. Another 63 cities with a population between one million and ten million inhabitants are home to 140 million people (27% of the urban population). In addition, there are hundreds of cities with less than one million inhabitants, representing 55% of the urban segment, with asymmetries in their development and equity.

All Latin American cities, mainly those with the highest population concentration, are characterized by being dual, divided or segregated cities, something that is expressed both spatially and socially (UN Habitat, 2012). In this urban scenario, there are more than 100 million people living in slums (e.g., *tugurios*, *villas*, or *pueblos jóvenes* as the precarious settlements are locally known) (UN Habitat, 2014), territories in which most of the urban poverty is concentrated, representing 26.3% of the urban population (ECLAC, 2019b).

Poverty is multidimensional in nature and does not affect all people equally. It affects children, adolescents and young people more, compromising their possibilities for future development. Among people of working age, poverty is greater among women than men (ECLAC, 2018b).

Rural areas in the region represent 20% of the total population, and 46.4% of the people living in them are poor (ECLAC, 2019b). This means that almost one in two people in rural areas do not have basic conditions for their development and well-being, which reflects the importance of serving this population segment, on equity and social justice grounds.

Finally, inequality remains a pending assignment for the region, as seen in the Gini coefficient data. Over the period 2002-2008, this coefficient fell by 1.3%; in 2009-2014, it was reduced by 0.8%; and by 0.3% between 2014 and 2017, with a value of 0.467 at the end of that period<sup>1</sup> (ECLAC, 2019a). In the countries with the highest

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<sup>1</sup> Average value of 18 LAC countries.

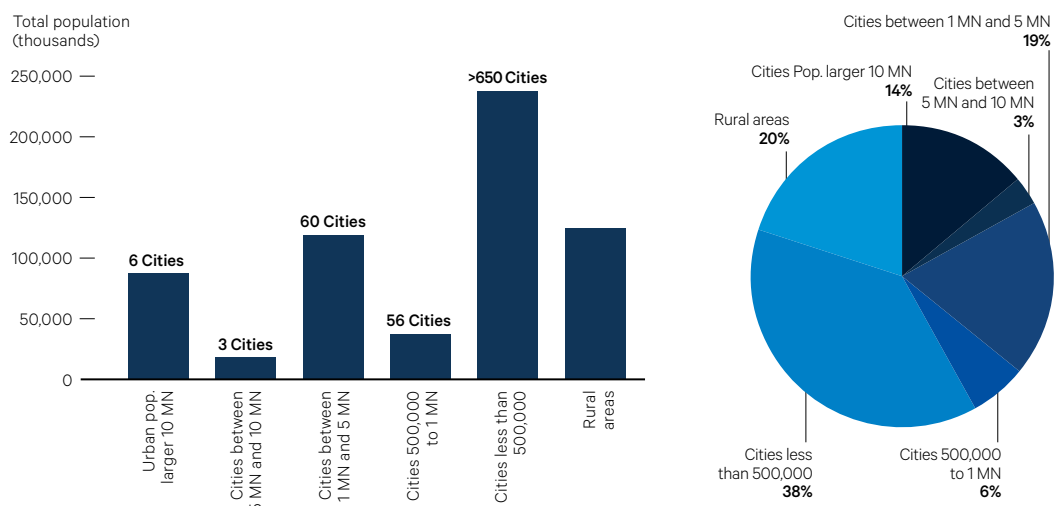
population in the region, however, the figure exceeds 0.50. Both the average value and that of each of the LAC countries are well above the average of the OECD countries,<sup>2</sup> which is not consistent with the level of economic development achieved in the region. This situation requires structural attention in various fields, since a growth model that reduces poverty, but perpetuates inequality, is not sustainable.

The actions that can be carried out in the water sector will contribute to reducing poverty and inequality, and entail multiple economic and social benefits, as set out below.

**FIGURE 2.**

Population distribution in LAC

Source: Authors based on the United Nations Report on Cities, 2016 (UN, 2017)



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2 The Gini coefficient ranges from 0 (or 0%) to 1 (or 100%), with 0 representing perfect equality and 1 representing perfect inequality; the average Gini coefficient of OECD countries in 2016 was 0.33; if only European countries are taken into consideration, the coefficient was 0.30 (ECLAC, 2018b).

## Water energizes well-being and is at the core of sustainable development

**Water, the foundation for growth and development.** Water is a fundamental engine of growth in various sectors of the economy. In the primary sector, it is essential for agriculture, livestock, forestry, fisheries, aquaculture and mining. In the secondary sector, it is a basic input for product transformation, manufacturing and electricity generation. And, in the tertiary sector, it contributes to tourism and various public services. Half of the global workforce is employed in eight sectors that depend on water and natural resources: agriculture, forestry, fisheries, energy, manufacturing, recycling, construction and transportation (WWAP, 2016). This relationship between water and economic sectors exerts greater pressure on water availability.

It is estimated that 42% of the world's active population depends on water, with 1.2 billion jobs deemed moderately dependent on water (WWAP, 2016). In the last 100 years, the demand for water has increased six times and demand continues to grow at an annual rate of 1% (WWAP, 2018). Two-thirds of the world's population live in areas subject to water scarcity for at least one month per year (WWAP, 2017) and this population could increase to 4.8 billion by 2050 (WWAP, 2018). In addition, 500 million people live in areas where water consumption exceeds local renewable water resources by a ratio of two to one (WWAP, 2017) and, by 2025, it is estimated that more than 60% of the world's population will be exposed to water stress conditions.<sup>3</sup> Currently, 1.8 billion people are affected by land degradation, desertification and drought (WWAP, 2018).

This pressure leads to the need for a new approach to **water security**, which includes: (i) guaranteeing the population access to water in adequate conditions of quantity and quality; (ii) ensuring physical availability to ensure productive and sustainable development; (iii) conserving and protecting water bodies from contamination, and (iv) reducing the risks associated with the lack or excess of water. Additionally, water security must be promoted from an integral perspective, covering key aspects of the contribution of water to development.

Water security is closely tied to the **Sustainable Development Goals (SDGs)**, approved in 2015 by the General Assembly of the United Nations. The initiative contains 17 goals and 169 targets that propose to eradicate poverty in all its forms, take transformative steps to shift the world onto a sustainable and resilient path, and ensure that “no one is left behind” (United Nations, 2015).

SDG 6, to ensure availability and sustainable management of water, sets eight targets, of which the first six cover the water cycle and the last two refer to the mechanisms to make it viable (Figure 3).

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<sup>3</sup> For a definition of water scarcity and water stress, see the following United Nations link: <https://www.un.org/waterforlifedecade/index.shtml>

**FIGURE 3.**  
Sustainable Development Goal Number 6  
Source: United Nations (2015)



Additionally, water permeates the other SDGs and affects their respective fulfillment. Agricultural irrigation, together with resilient agricultural practices, increases agricultural productivity [crop yields] and food security, reduces the risk of undernutrition and side effects such as stunting (SDG 2). Water is also essential to reduce the rates of neonatal and child mortality (SDG 3), since one of the main causes of death in children under five is diarrhea, largely caused by lack of water, sanitation and hygiene.

Similarly, access to water in the home is part of the concept of decent housing and the improvement of peri-urban neighborhoods and informal settlements (e.g., *pueblos jóvenes*) (SDG 11). Access to water on premises allows children, especially girls, to devote their time to attending education centers (SDG 4) instead of having to devote it to water transport, which promotes greater opportunities for personal development and employment, gender equality and non-discrimination (SDGs 8, 5 and 10).

With the effects of climate change and the need to reduce greenhouse gas emissions, renewable energies have a preferential role for energy security, based on SDG 7 and SDG 9. Hydropower generation is part of these non-polluting options. In the LAC region, it represents more than 60% of the energy

matrix (WWAP, 2014; WWAP, 2016), well-above the world average of 16%. In addition, water enables cooling of thermoelectric plants and is used in the production of biofuels.

Water also enables the preservation of ecosystems, fundamental in the nutrient cycle and in the carbon cycle. Ecosystems provide food, water, wood, fibers and active ingredients for medicines; wetlands<sup>4</sup> provide ecosystem services as water sources or surface water storage, or to regulate floods, mitigate the impact of storms or recharge groundwater. They also help control erosion and sediment transport. Therefore, SDG target 15.1 aims to ensure the conservation, restoration and sustainable use of terrestrial and freshwater ecosystems, in forests, wetlands, mountains and arid areas, which is closely linked to target 6.6. For its part, SDG target 15.9 proposes integrating the values of ecosystems and biological diversity into national and local planning, development processes and poverty reduction strategies (Figure 4).

Finally, through proper watershed management, it is possible to rationalize the use and exploitation of the water resource, store water in natural or artificial reservoirs to mitigate drought events, limit infrastructure works that impact the hydraulic behavior of rivers—which may as a consequence cause potential damage—or carry out structural and non-structural measures to control floods, generating more resilient spaces (SDGs 11, 12 and 13).

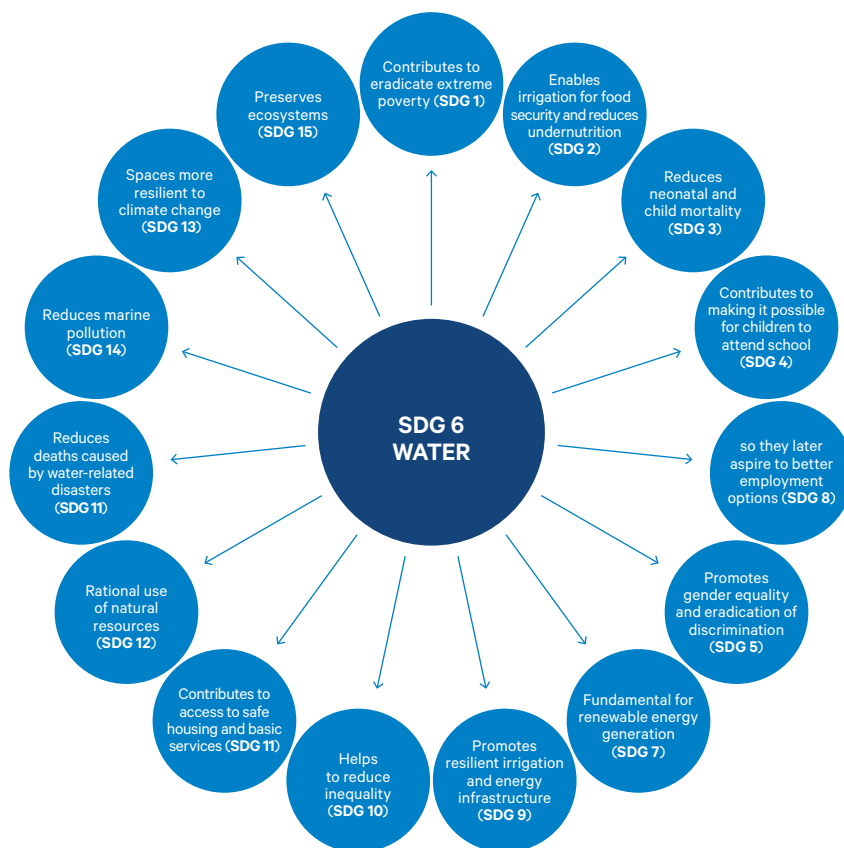
Due to the multiplier effects exposed, water contributes to the eradication of extreme poverty (SDG 1) and the reduction of inequality (SDG 10). This is consistent with poverty measurement methods based on structural deficiencies in the level of well-being, such as the Unsatisfied Basic Needs Index (UBN) or the Multidimensional Poverty Index (MPI), which assess variables such as the lack of access to drinking water and sanitation, which are two essential services—although not sufficient—to eradicate extreme poverty, which in the region remains a primary challenge, as discussed below.

Based on the above, CAF, as the development bank of Latin America, aims to strengthen its operations in the water sector through a diversification of approaches, products and instruments, in addition to intersectoral coordination and cooperation, with a holistic and program perspective to improve the effectiveness of its interventions and their impact for the benefit of society as a whole.

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4 Continental wetlands: lakes, rivers and marshes.

**FIGURE 4.**  
Impact of SDG 6 on the other SDGs  
Source: Authors



### CAF's experience in the water sector: elements for a strategy

**CAF's participation in the water sector is gradually increasing.** Demand for CAF's assistance from the countries in the region has grown significantly: not only have amounts approved over the last ten years exceeded USD 6 billion, which has allowed CAF to leverage another USD 4 billion, but also the institution's positioning in the region has progressively improved. In the water sector alone, CAF has operations in ten countries. In Bolivia, Ecuador and Panama, CAF is one of the largest sources of financing. In other countries, CAF plays an important role and continues to increase the number of operations. At the same time, it receives more and more requests for assistance as a result of the challenges assumed by these countries regarding sustainable development, and CAF's greater sectoral dialogue with them. Similarly, technical cooperation initiatives have multiplied and CAF's role as an implementing agency of resources derived from the climate funds has also been on the rise.

In addition, CAF stands out as an increasingly frequent interlocutor in the global dialogue on sectoral public policies. Examples of this include its role in the World Water Forums since 2011, having led the regional process of South America in 2015 and, in 2018, in Brasilia, when it assumed responsibility for the coordination of one of the global agenda items: water finance. In addition, the bank has participated since 2011 in the World Water Week held annually by the Stockholm International Water Institute (SIWI) and, in recent years, it has overseen the co-organization of several seminars that constitute the event's core program. The Water Dialogues between Latin America and Spain, which are also held annually, represent another initiative of CAF and Spain in which high-level authorities in the region and world experts debate public water policies, their challenges and trends, as well as the links aimed at horizontal cooperation between member countries. Since 2016, CAF has been a member of the Board of Governors of the World Water Council and actively participates in the events organized by this collective body. In addition to this series of events, CAF has participated in regional conferences like LATINOSAN: (i) to support countries in their exchange of experiences and good practices, (ii) to generate multiplier effects in water management, and (iii) to position CAF as an interlocutor with regional presence.

CAF is also engaged in the progressive application of project cycle management tools, from project inception to closure and the measurement of project impacts. Lessons have been learned that are used in the structuring, evaluation and monitoring of operations jointly with countries. The most important of these lessons serve as a foundation for the design of instruments that will contribute to the achievement of the objectives of this strategy.

**Lessons learned.** Based on the accumulated experience, especially in the last fifteen years, CAF has assimilated various lessons, which are summarized below.

- a. The quality of the studies and final designs impacts the execution of operations, the fulfillment of the objectives and milestones, and investment sustainability. If the proposed designs have a preliminary development or are in phases prior to the final design, uncertainty increases with regard to the chosen alternative, budgets and deadlines, which raises the level of risk. On the other hand, even in the case of projects with studies at the final stage, their quality may not be adequate. Both cases illustrate the need to improve pre-investment planning and quality, as well as to include relevant actors at this stage to reduce risk and avoid extensions of execution deadlines or increases in expected operation costs, as well as to ensure the achievement of objectives and investment sustainability. This process must be tackled via a gradual system of change and improvement that does not paralyze the countries' investment and execution rates.
- b. The definition of roles and functions among the various participating institutions facilitates the coordination of programs and projects. A solid institutional framework, strengthened by the definition of operational regulations or manuals for the programs, provides clarity regarding attributions and responsibilities, reducing the risk of overlapping or, conversely, of gaps in the accompaniment of projects.

- c. Implementing agencies with strengthened capacities facilitate the good execution of the programs or projects, since, in general, they have qualified personnel, standardized processes and procedures, and information systems for monitoring the projects, aimed at the sustainability of the investment. CAF can support those less developed countries in the transfer of project management processes or systems.
- d. The ex-ante definition of indicators, baselines and goals, as well as the development of a logical framework, enable an adequate measurement of project results. The appropriate selection of outputs, outcomes and impact indicators makes it possible to properly assess the projects' contribution to the countries' socio-economic development.
- e. The implementation and sustainability of investment programs and projects improves when capacity-building components are included for the sector's regulatory bodies, implementing agencies and the service providers. Special attention is warranted when the projects include cutting-edge technology, the redefinition of processes or the development of innovative management models, such as cases of third-party delegation.
- f. Given the growing demand for investments to cover the gaps in access to water and sanitation services, it is necessary to improve asset management, promoting maintenance and selective replacement programs that make it possible to extend the lifespan of the infrastructure and ensure the continuity of long-term plans, essential for the sustainability of services.
- g. CAF's ongoing support contributes to the dialogue with sector organizations and the timely identification of potential deviations from project goals and targets, as well as any adjustments, which has an impact on the results achieved.

**CAF deems it necessary to have a water strategy that not only guides its support and assistance, but also helps member countries to achieve the SDGs.**

CAF's strategy is based on the experience gained in project development over the past 20 years, as well as the global commitments assumed by the countries in the field of water and the pressing problem in the region. It applies a holistic and interrelated approach, and takes advantage of the instruments and tools that support its operations. The strategy is not a static document, since the response to the demands is subject to change according to innovative processes in technologies, financing models, governance, and new instruments and tools, as well as the sectoral analysis that CAF performs periodically in their member countries. Therefore, this strategy should be reviewed and updated, so that it can adapt to the geopolitical context of the region, the public policies of the countries, and the dynamics and programming of CAF projects.





2.



# Water in Latin America: Five core messages

The regional challenges to attain water security and meet the SDGs can be summarized into five core messages.

## **Water and sanitation are human rights; the global commitment is to attain universal access by 2030**

In July 2010, the United Nations General Assembly recognized drinking water and sanitation as a human right that is essential to the full enjoyment of life and all human rights. Resolution 64/292 calls upon States and international organizations to provide financial resources, capacity-building and technology transfer, through international assistance and cooperation, in order to scale up efforts to provide safe, clean, accessible and affordable drinking water and sanitation for all.

Access to water is essential to guarantee health and nutrition, and is intrinsically linked to sanitation, a protective shield against disease. Water is a necessary source of nourishment for growth, lactation, digestion, metabolism, excretion, hydrolysis and the transport of nutrients.

However, if the water we drink is not free of pathogens and chemical pollutants, it can cause multiple diseases, some even life-threatening. The World Health Organization's guidelines provide recommendations and a list of the multiple diseases and risks that are inherent to unsafe access to drinking water (WHO, 2006). Drinking water does not depend solely upon the absence of fecal pollution. Some microorganisms proliferate across water distribution networks (such as legionella), while others are present in water sources and can even cause epidemics. It is estimated that 845,000 individuals die of diarrhea globally each year because of water pollution, inadequate sanitation facilities or poor handwashing (WHO, 2016). In Latin America, although the number of deaths resulting from diarrhea has been steadily decreasing, the disease rate resulting from this cause remains high, with almost 1.5 million cases per year (WHO,

2016). Diarrhea, though, is highly preventable. The mortality rate of children who are born alive and die before the age of five has a significant correlation with environmental health and could be prevented if these risk factors are tackled. Studies conducted by the World Health Organization (WHO, 2014) suggest that at least 58% of diarrhea events in middle- and low-income countries can be linked to the unavailability of water and sanitation facilities (WHO, 2016).<sup>5</sup>

An unhealthy environment causes other diseases, such as malaria, trachoma and schistosomiasis, while open defecation is the main cause of gastrointestinal conditions, such as ascariasis and trichuriasis (WHO, 2016).

Stunting, in turn, has gained precedence as a key global marker of child undernutrition and is one of the core points on the SDG agenda (UNICEF, 2016). There is statistical evidence showing a high correlation between open defecation and stunting, which hits mainly early childhood (Spears, 2013) and has irreversible effects on subsequent child development. According to UNICEF data, 10% of LAC children aged between zero and 59 months have moderate to severe stunting,<sup>6</sup> and this figure exceeds 20% in several countries (UNICEF, 2016). Child undernutrition has long-term consequences: productivity losses associated with undernutrition are higher than 10% of an individual's potential income throughout life (World Bank, 2010). Undernourished children are more likely to face cognitive impairments and lower educational levels than those who receive adequate nutrition, restricting their work potential for life.

On the basis of the above, Latin America has strived to increase the coverage of water and sanitation services, enabling access<sup>7</sup> to drinking water to more than 149 million people since 2000, which accounts for 97% of the region's population (JMP, 2019). However, close to 21 million individuals still do not have basic access to these services, of whom 15 million live in rural territories, i.e. almost three-quarters of the population without basic access. This situation is worsened by higher water demand resulting from Latin America's demographic growth, expected to rise from 645 million inhabitants estimated in 2017 to 717 million by 2030 (CEPAL, 2018d).<sup>8</sup>

In terms of sanitation, more than 176 million people now benefit from this service: the population with access to sanitation facilities grew from 73% in 2000 to 87% in 2017 (JMP, 2019). This represents a significant step forward, although it is insufficient insofar as the Millennium Development Goals' target to halve the gap was not reached. By late 2017, 83 million people still lacked this basic access, 44 million of whom live in cities. In addition, of the 38+ remaining million inhabitants who live in rural territories, one out of three does not have access to decent toilets.

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5 Studies conducted early in the new millennium mention a ratio of even 88% of cases (WHO, 2000).

6 Children in the age span referred to who are -2SD (standard deviations) below the mean length/height-for-age according to the WHO Child Growth Standards

7 Basic water access involves drinking water availability from an improved water source (tubewells or boreholes, protected dug wells or protected springs) to the extent a round trip to collect it will not take more than 30 minutes.

8 <https://estadisticas.cepal.org/cepalstat/tabulador/ConsultaIntegrada.asp?idIndicador=28&idioma=e>

Similarly, the gap increases considering the demographic growth expected by 2030. In general, the sanitation challenge is bigger than in the case of drinking water because political actors have assigned low priority to the sanitation theme in urban and peri-urban environments, which adds to inadequate sanitary education and little knowledge among the population of the risks and diseases associated with lack of sanitation facilities. In the rural environment, geographic dispersion makes it more likely to have on-site sanitation options, which should be addressed from a territorial and inter-sectoral perspective.

**Moving toward universality of water and sanitation services involves a significant financial challenge, but the cost of not doing so is even greater.**

Worldwide, almost 785 million people lack basic access to water. Nearly two billion people lack access to basic sanitation. Meeting this challenge involves an average worldwide investment of USD 114 billion per year until 2030 (Hutton & Varughese, 2016). In contrast, up until 2015, investment in development had not exceeded USD 18 billion annually worldwide, almost 60% of which was for water and sanitation (Winpenny et al., 2016; Leigland, Trémolet & Ikeda, 2016; Kolker, Kingdom, Trémolet, Winpenny & Cardone, 2016; OECD, 2016).

CAF estimates that an average annual investment equivalent to 0.3%<sup>9</sup> of LAC's GDP is needed to ensure 100% of the population in the region has access to drinking water, to increase access to sewerage from 86% to 94% of the population, to increase urban wastewater treatment from 30% to 64%, and to improve urban stormwater drainage from 50% to 85% (CAF 2011). This does not mean that all countries need to invest in the same proportion. The investment made by most LAC countries ranged from 0.07% to 0.63% of GDP.<sup>10</sup> Based on the analysis conducted, several countries with major gaps in access to water and sanitation allocated percentages lower than 0.15% of their GDP. It is therefore important that the countries most lagging in water and sanitation coverage should review their strategies and budgets allocated to the water sector. It is also necessary to improve implementing capacity in expenditure, as shown by the difference between the capital investment implemented and the capital investment allocated to budgets, and to substantially improve quality, efficiency and impact. In any case, the greatest cost is that associated with maintaining the status quo. Studies conducted by CAF show that the cost of poor-quality water and sanitation services—or a lack thereof—may be 0.8% to 3.6% of annual GDP in the countries as a result of the increase in healthcare expenses and losses in well-being and productivity (CAF, 2018).

In addition, country fiscal capacity should be taken into account, subject to a more complex and uncertain regional macroeconomic setting. In fact, over the past ten years, public expenditure in infrastructure<sup>11</sup> has not exceeded 1.5% of regional GDP (ECLAC, 2017), in contrast to the 1980s, when it was 3% to 3.7%. In this regard,

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9 The GDP for Latin America and the Caribbean in 2017 was USD 5.97 billion (World Bank, 2018)

10 Data from the historical record of 20 countries in the region, for the period 2008-2015 (INFRA LATAM, accessed in December 2018).

11 Considers transport, telecommunications, power, and drinking water and sanitation sectors.

meeting the SDGs, in particular SDG 6, requires—along with reasonable increase in public investment and greater planning and efficiency in its expenditure—the exploration of financing programs with greater participation of capital markets, local banking and private enterprise.

### **Quality improvements in management are required to provide safe water and sanitation services**

Despite the high levels of coverage attained by LAC countries in terms of basic access to drinking water, there are differences in service levels, (ADERASA,2016; WWAP, 2015; WWC, 2018), with considerable losses of water, exceeding 40% on average (WWC, 2018); frequent interruptions in the service, and insufficient monitoring of the physical, chemical and bacteriological properties of the water supplied.

SDG 6 refers to universal access, but also emphasizes safe, affordable management of the resource.<sup>12</sup> In that regard, the World Health Organization and UNICEF’s Joint Monitoring Program (JMP) reports that only 74% of the LAC population has this level of service (Figure 5), which means that over 116 million people do not have safely managed services. The most critical situation is in small towns and rural populations, where disinfection periodicity and monitoring are poor, usually associated to inadequate management, which points to promoting urban aggregation models and associative models in rural settings. In larger cities, the challenge is to improve water quality monitoring and reduce the intermittence of the services, thereby ensuring (a) compliance with all parameters set forth in applicable regulations, and (b) continuity in supply. This poses challenges regarding: (i) potabilization facilities in accordance with the quality of the water input; (ii) equipment of laboratories and mobile devices; (iii) allocation of human resources and budget for monitoring and control; (iv) sustainable rates to cover the costs of operation, maintenance, replacement and the expansion of infrastructure; (v) sectorization and management of water demand; (vi) education and training of operative staff, and (vii) development of safety and emergency protocols.

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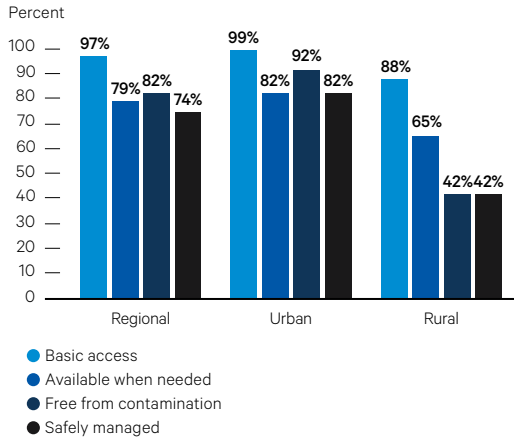
<sup>12</sup> “Safely managed” means availability of an improved water source located on premises, available when needed and free from fecal contamination, i.e., with standards of continuity and of physical, chemical and bacteriological quality.

**FIGURE 5.**

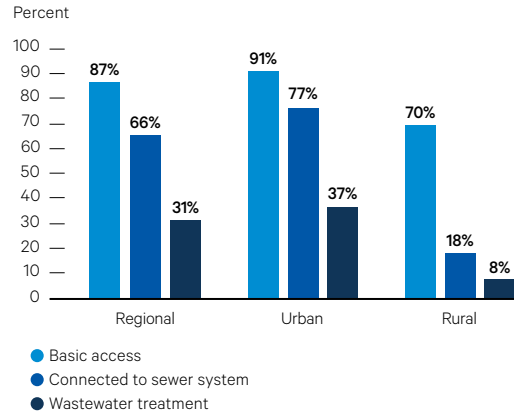
Basic, safe access to water and sanitation in LAC

Source: Authors based on JMP report (2019)

**Access to water**



**Access to sanitation**



In regard to access to sanitation, only 77% of the urban population is connected to a sewer system, which means that 75 million people in cities use on-site solutions, of which construction and maintenance quality is questionable, given the lack of supervision, with high probability of a large part of these installations contaminating urban aquifers and degrading ecosystems. In the region, evidence of fecal contamination has been found at depths of more than 50 meters in several urban aquifers.

**It is necessary to move from a focus on infrastructure to a focus on service.**

Progress in water and sanitation coverage has been mainly based<sup>13</sup> on strong fiscal support of investments, implemented through various programs or projects with high level of participation of central governments. This situation has meant that programs have focused on the execution of investments, i.e., on infrastructure intended for expansion or rehabilitation of the systems. Nevertheless, in many of the countries in the region, subnational agencies are responsible for providing water and sanitation services.<sup>14</sup> Providers are therefore state/provincial, intermunicipal or municipal and usually face challenges in achieving sustainability,

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13 Except in Chile, which promoted private participation of its main urban operators in the late 1990s, and to a lesser extent, Mexico, Brazil and Colombia.

14 Exceptions are the metropolitan area in Lima, Peru, which is the responsibility of a company that depends on the national State, as well as Uruguay and some Central American and Caribbean countries.

with highly politicized steering committees; therefore technical, commercial and financial management has much room for improvement.

With the exception of some metropolitan companies with performance indicators comparable to those of world-class companies, LAC providers overall are a heterogeneous group of entities that are highly dependent on fiscal resources for financing their investments, and even for covering their operation and maintenance costs (WWAP, 2015). The challenge to sustainability is not only commercial or price-dependent, but also involves limitations of the economy of scale, corporate governance and technical capacity. Urban providers lack incentives to expand their action into new zones of population expansion—usually peri-urban—so these new zones therefore usually establish their own providers, thereby atomizing urban management and creating greater challenges for sustainability.

It is necessary to move from an approach focusing on the infrastructure built to an approach addressing the service provided by that infrastructure, that considers various aspects of the investment projects in order to enhance an enabling environment—standards, policies and plans—and to strengthen normative and regulatory institutions as well as provider institutions according to principles of economic efficiency, social equity, good governance and environmental sustainability.

In line with the aforesaid, achieving greater efficiency in water services management should consider actions related to “asset management” and “demand management,” which are approaches that maximize the use of existing infrastructure. Asset management encourages timely recording, monitoring and maintenance of infrastructure, extending its lifespan and enabling capital investments to be deferred. Demand management discourages water from being wasted by users and reduces water loss by the provider. Both approaches, which are highly valuable, are usually disregarded in the face of opportunities to build new water projects, to the detriment of public finance.

In rural zones, water is usually supplied by a community-based operator (CAF, 2016), while sanitation—usually provided by on-site solutions—depends on each family. This model faces challenges when any of the essential components of the water system need to be expanded or rehabilitated, because the tariffs paid by each family usually cover the minimum required for normal operation and maintenance, with no margin for expansion or significant rehabilitation. Another common feature in rural water systems is a lack of attention to disinfection, which is essential to guarantee pathogens-free water. In this context, several programs to support investment have tried associative models, with and without subnational government subsidy, as well as greater involvement of subnational government through technical assistance and training. In any case, service sustainability requires investment programs to consider components allocated to accompany infrastructure projects with community mobilization, technical and commercial reinforcement of the provider, and if necessary, reinforcement of the subnational government through a subsidiarity approach.



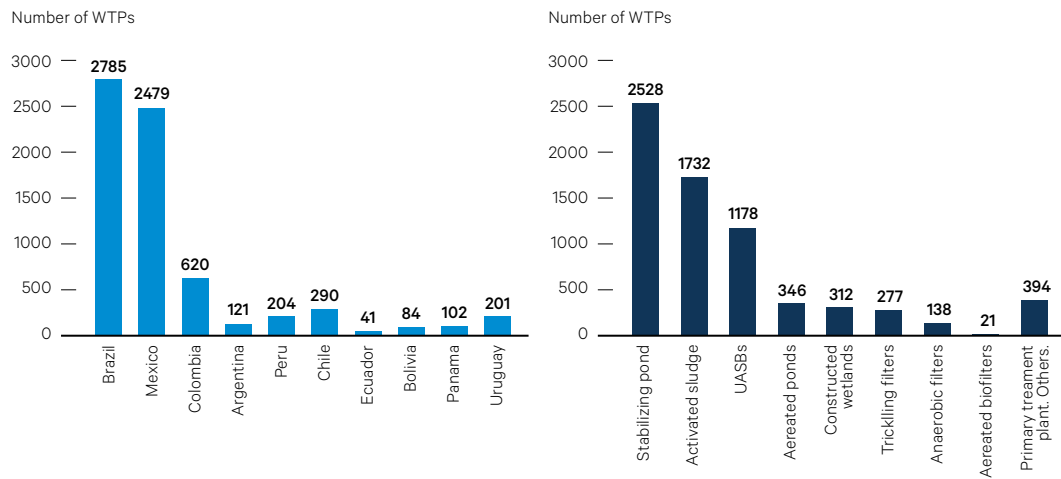
## Water bodies must be protected from contamination in order to ensure water availability and conservation of biodiversity, fostering a circular economy

### Wastewater treatment needs to be prioritized in order to reduce contamination.

A study performed by CAF in ten countries calculated that there are 7,000 plants in the region for municipal wastewater treatment (CAF, 2017) (Figure 6). However, they only cover 30% to 40% of the water collected by municipalities (WWAP, 2017) and their condition is not properly maintained.

**FIGURE 6.**

LAC wastewater treatment plants  
Source: CAF (2017)



There are several reasons for this: regulations with insufficient cost-benefit analysis that does not foster investment; lack of demand from society; choice of technologies whose operation and maintenance program is highly provider-dependent; high operation and maintenance costs not covered by tariffs; insufficiently qualified personnel; and lack of enforcement of quality discharges, in particular non-domestic discharge into the sewer system,<sup>15</sup> which causes damage to collector and outfalls and interferes with the operation of plants designed for the treatment of domestic wastewater. SDG target 6.3 establishes the reduction of untreated wastewater by half,

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<sup>15</sup> This is due to discharge from both commercial and industrial facilities. Industrial discharge often goes into the sewer system without adequate required pre-treatment.

but this will not be achievable without a change in public policy, prioritizing wastewater treatment.

In addition, mining and industrial wastewater that is not discharged into urban systems requires more specialized treatment. This is difficult to monitor and severely affects ecosystems and biodiversity. Damage is sometimes irreversible<sup>16</sup> and reduces water availability, aggravating socio-environmental conflict. Agricultural drainage, especially runoff with pesticides and fertilizer, can be equally contaminating. In LAC, these residues increased from 89 kilograms per hectare in 2002 to 126 kilograms in 2013 (FAO, 2016) and are even more difficult to control due to their nature as non-point source pollution.

A circular economy aims to revalue the byproducts of a given process, as is done with wastewater, where the methane and sludge generated can be reused sustainably for power generation or for agricultural soil improvement, with potential to create additional benefits for the provider. The water-food-energy security nexus is seen more clearly in these interlinkages.

Finally, there is a symbiotic relationship among water, forests and soils. Future water availability and ecosystem balance depend on adequate management and conservation. Regulatory frameworks address the protection and conservation of water sources and environmental flows, but implementation has been poor, and actions on ecosystem functions and services have only been carried out in few cases.<sup>17</sup> Although nature alone cannot guarantee water safety for humanity, preservation and effective water management improves resiliency, consistent with the IWRM framework.

## **Agricultural irrigation contributes to food security. LAC has high potential for reducing undernutrition and hunger.**

**Lack of food security leads to undernutrition.** SDG 2 establishes ending hunger in the world, as well as improving nutrition and progressing toward sustainable agriculture. Attaining this goal requires eliminating food insecurity which causes emaciation,<sup>18</sup> delayed child growth and lack of micronutrients in children, all signs of undernutrition. Despite this goal, which was set in 2015, undernourishment has increased for the third consecutive year, affecting 39.3 million people—6.1% of the population in the region (FAO, 2018a). The largest number of undernourished

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16 Mining and industrial wastewater can contain toxic organic compounds such as hydrocarbons, polychlorinated biphenyls (PCB), persistent organic pollutants (POP), volatile organic compounds (VOC) and chlorinated solvents (WWAP, 2017).

17 Ecosystem services include water storage by forests, aquifers, soils, lakes and bogs; in turn, rivers and bogs are also means of transportation; flood meadows and stable porous soils contribute to flood control, while mangroves, coral reefs, protective islands and vegetation barriers protect coasts from storms and flooding.

18 Lower than normal weight according to height, usually as a result of acute food shortage.

persons is in South America, where 21.4 million are unable to cover their calorie intake needs. Moreover, severe food insecurity has also increased, affecting 47 million people in the region.

As noted by the Food and Agriculture Organization report (FAO, 2018b), this increase is largely explained by the variability and extreme conditions of the climate in several regions around the world. Indeed, rainfall recorded in most of the world during 2015 and 2016 was lower than average and lower than usual, particularly in Africa, Central and South America, and Southeast Asia. This decline in precipitation seriously impacted zones where agricultural production, food systems and livelihoods depend only on rainfall (rainfed agriculture), which are exposed to greater risk of food insecurity and undernutrition.

In this regard, progress in the eradication of hunger requires sustainable agriculture. Agricultural irrigation provides the opportunity to ensure year-round water availability, increasing crop cycles and diversifying production. Both irrigation and crop rotation are strategies for adaptation to climate change and to increase productivity. They tend to stabilize farmer income, though climate resilience also requires the adoption of food systems that will guarantee markets.

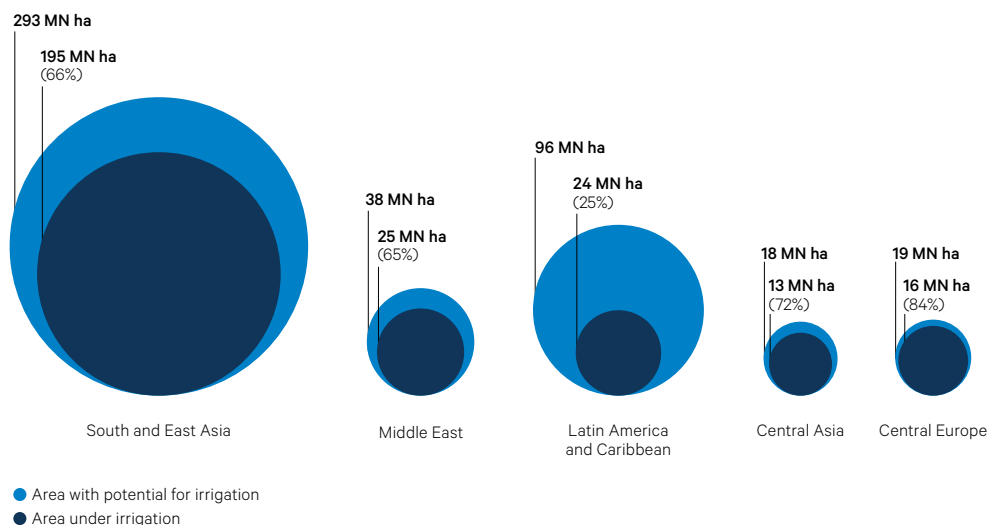
**Agricultural irrigation can be expanded without affecting forest zones.**

The region uses 190 million hectares for agriculture, primarily rainfed agriculture (FAO, 2018c).<sup>19</sup> Potential irrigated surface area in LAC is estimated at 96 million hectares, whereas land area with equipped irrigation is around 24 million hectares (equivalent to 25% of irrigation potential and 13% of total cultivated land area) (Figure 7), with preeminence of Mexico, followed by Brazil (FAO, 2018c). There is high potential for areas currently rainfed to be under irrigation to increment agriculture productivity and reduce vulnerability to climate variability—a conversion which should prevail over expansion of the agriculture frontier into forest areas, which causes deforestation and damages biodiversity. Moreover, rainfed farming yield can be improved by means of techniques for soil moisture conservation and, where feasible, by applying supplementary irrigation during growth phases of drought-sensitive crops.

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<sup>19</sup> Last consultation in December 2018.

**FIGURE 7.**  
Surface area equipped for irrigation and with irrigation potential  
Source: Authors based on Aquastat data (FAO,2018c)



Potential for expansion should go hand-in-hand with an improvement in efficiency. Agriculture under irrigation accounts for the largest consumption of water in the world, LAC is no exception, with irrigation accounting for almost 75% of total consumption (FAO, 2017; WWAP, 2015). As water use increases and the effects of climate change become evident, zones lacking water are expanding. Cases of overexploitation of aquifers in several countries in the region are on the rise and there is more competition for water. This scenario contrasts with the existence of multiple unlined irrigation canals and ongoing use of techniques based on surface irrigation systems. This calls for actions to increase the efficiency of water use for agricultural irrigation.

In line with the above, large-scale government-subsidized irrigation projects should be articulated with small-scale projects to ensure harmonious agricultural development. Agricultural production in LAC is characterized by a concentration of lands in large, highly mechanized farms using advanced agricultural practices to produce grain, oilseed and livestock, constituting a major provider of agricultural raw materials on a global scale. This kind of agriculture coexists with 16 million family farms which group over 60 million people and use 23% of the agricultural surface area in LAC (FAO, 2014). At a country level, these farms provide 27% to 67% of total food production and generate 57% to 77% of agricultural employment, but there is a need for better training to improve yields, raise the technical level of their systems, diversify their production, and market it locally.

## Integrated Water Resources Management should be consolidated for sustainable use and better flood and drought control

### **Integrated Water Resources Management (IWRM) promotes sustainable use and harnessing of water while reducing potential conflicts for the resource.**

LAC accounts for 15% of the world's land surface area and about 30% of its water resources (WWAP, 2016), with an availability of 28,700 m<sup>3</sup> per capita per year<sup>20</sup> (FAO, 2018c). However, its distribution in volume is uneven, and even more so if it is analyzed according to demographic development of the countries. Several countries have over 40,000 m<sup>3</sup> per capita/year of internal renewable resources, while others have less than 7,000 m<sup>3</sup> per capita/year and some island countries are under water stress<sup>21</sup> (Figure 8). There are also major imbalances in terms of water availability within countries: Peruvian, Ecuadorian and Bolivian Amazonia or southern Mexico have plentiful water resources, while the Peruvian coast; Bolivian, Peruvian and Ecuadorian Andes; northern Mexico; the Argentine Puna and northern Chile<sup>22</sup> have low precipitation and are characterized by successive periods of drought.

Water availability is also subject to the effects of climate change, which alter precipitation and temperature patterns, increasing the frequency, intensity and severity of extreme weather. Climate projections for the region indicate that by the end of the 21st century, temperatures will increase by 1.6°C to 4°C (34.88°F to 39.2°F) in Central America and 1.7°C to 6.7°C (35.06°F to 44.06°F) in South America (ECLAC, 2015), accelerating the retreat of tropical glaciers in the latter case. Climate change has greater impact on rural lands inhabited by poor people, who will be forced to migrate, with harmful effects on family farming and a negative impact on national and regional economies, given that the farming sector accounts for 5% to 6% of regional GDP, 23% of the region's exports and 13.8% of world agri-food exports, and employs 16% of the active population (BID, 2014; ECLAC, FAO and IICA, 2017).

Within this context, IWRM is an internationally accepted approach that defines a coordinated process for managing water, soil and other related resources on different territorial scales, with the goal of establishing a balance among economic efficiency, social equity and environmental sustainability, which are dimensions of sustainable development. For such purpose, IWRM encompasses: (i) an enabling environment based on laws, policies and plans, establishing a reference framework; (ii) institutional arrangements for water management on different scales; (iii) management tools and instruments for regulation, monitoring and compliance, enabling rational informed decisions to be made (GWP, 2000), and (iv) investments in water infrastructure to meet the multiple demands for water and to manage drought and flooding (Lenton & Muller, 2009).

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<sup>20</sup> Water availability in other regions is considerably lower, e.g., in Asia it is about 8,500 m<sup>3</sup> per capita (calculation based on data per country, AQUASTAT, 2014).

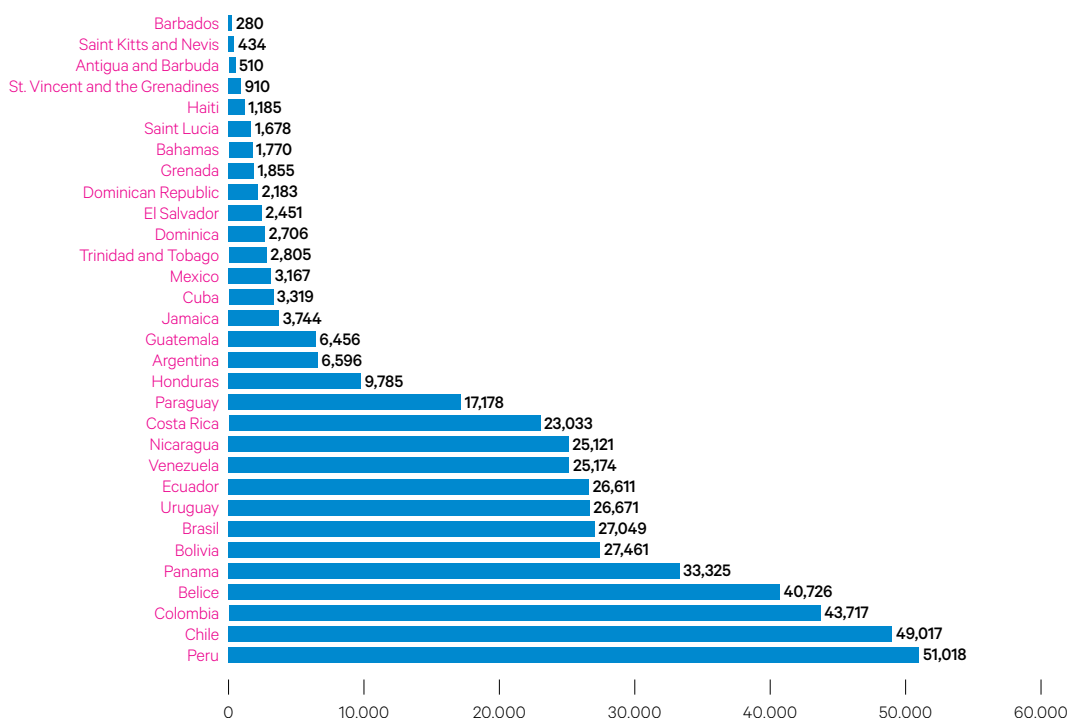
<sup>21</sup> The threshold of 1,700 m<sup>3</sup> per capita defines whether a country is under water stress (as are, for example, Haiti and Saint Lucia), while scarcity means less than 1,000 m<sup>3</sup> per capita per year.

<sup>22</sup> Chilean regions I and V of the metropolitan region have less than 1,500 m<sup>3</sup> per capita per year.

Given IWRM's holistic concept, several countries in LAC have included it in their laws and regulations on the subject as a process necessary for regulating the various functions of water. However, its implementation faces technical, social, institutional and economic-financial constraints that limit its evolution and pose governance problems.<sup>23</sup> Few countries in the region have specialized national agencies to promote the establishment of basin agencies and councils, and those that do are not exempt from challenges in sustainability. In the rest of the countries, the institutions in charge of water regulation usually work at sub-sectorial levels and the various management instruments are not applied due to limitations in budget and organizational abilities. SDG 6.5 monitoring report states that, based on country self-evaluation, IWRM implementation in the region is 35/100, below the world average of 49/100 (UN Environment, 2018), with weaknesses in the four aspects mentioned above.

**FIGURE 8.**

Renewable internal water resources (m<sup>3</sup>/inhabitant/year)  
Source: Authors based on Aquastat data (FAO, 2018c)



...  
23 Refers to the dynamic equilibrium between water user demands for water and the institutional capacity of the state to meet them efficaciously and legitimately, in accordance with known management rules, procedures and tools.

This slow evolution does not invalidate the approach, which has demonstrated its ability to satisfy various demands for water and mitigate socio-environmental conflicts, but it requires IWRM to be understood as a continuous process, according to the specific needs and actual possibilities of the countries. The inclusion of change management as well as operational mechanisms revitalizes the conception of IWRM as an adaptive strategy (Smith & Clausen, 2018) and as a process which is not only technical, but also of ongoing agreement and coordination at the organizational levels that are found to be practical.

**Water use for human consumption and agriculture creates pressure on the resource, and this pressure is increased by hydropower generation and mining.** Although hydropower generation does not consume water, it does involve storage and regulation of water, conditioning downstream use. It may benefit other users—as is the case of multipurpose dams—or alter the normal flow pattern. This is not a minor issue in LAC, where power generation is highly dependent on hydroelectric developments, with more than 60% of power production coming from such sources, compared to the world average of 16% (WWAP, 2014; WWAP, 2016).<sup>24</sup> Forecasts suggest that LAC hydropower generation will continue to increase as the energy mix is diversified with other renewable resources, due to the plentiful water resources and geographic conditions in the region, where the potential is 700 GW, less than one-fourth of which is under current development (WWAP, 2014). As an example, a recent study by CAF (2018) concluded that useable technical hydropower potential in Bolivia is 38,200 MW, while its current energy demand is less than 10% of the country's potential. Along the same lines, different energy plans in the countries aim to convert the region into a power hub with export capacity, encouraged by world pressure to replace energy from fossil fuels that generate greenhouse gases.

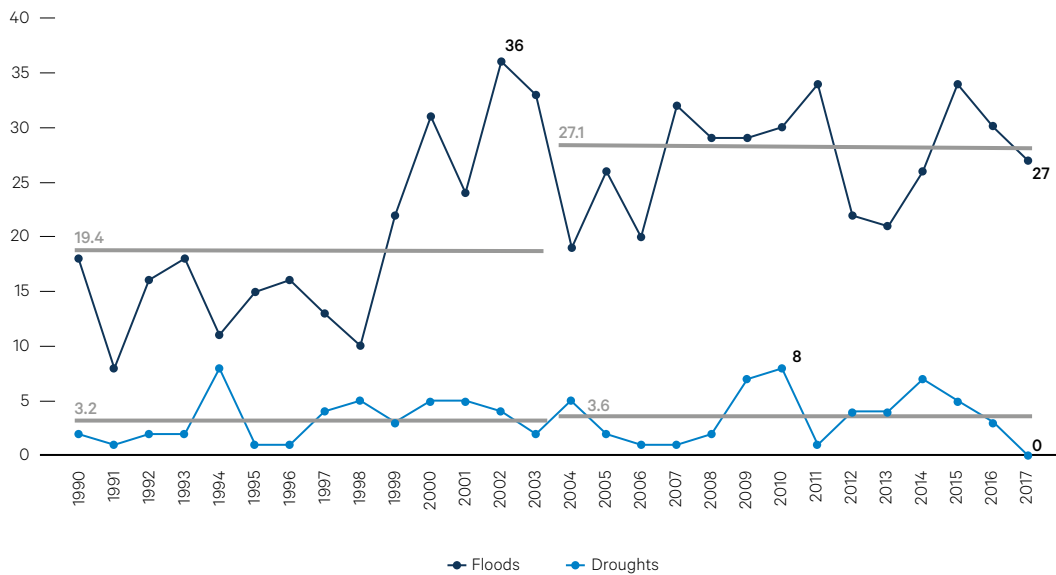
In addition to those mentioned above, another major water user is mining. Mining is a key player in the economies of Chile, Peru, Bolivia and Mexico, and to a lesser extent, Colombia, Argentina and Brazil. LAC is the world's most attractive destination for mining exploration (Bastida, 2018) as well as being the region with most socioenvironmental conflicts (ECLAC, 2018c). Although there are few records of use of water for mining, they are not unimportant. Some isolated studies report volumes equivalent to those used by intermediate-sized cities in the region. The lack of available information also reflects the insufficient regulation in place on the subject, in addition to the existence of informal mining, which adds a variable to the uses of water, with the negative externality of informal mines not usually treating their water, thereby polluting the environment.

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<sup>24</sup> The link to the power sector works in both directions, since most water and sanitation systems require energy for operation, as do most technical agricultural irrigation systems. Biofuels compete with food crops for water and soils. This gives rise to the Water-Energy-Agriculture Nexus approach.

**Disasters caused by too little or too much water are increasingly intense due to climate change, and response to them is still isolated and reactive.** Climate-related catastrophes are an important factor in ecosystem degradation and loss, particularly regarding increased soil erosion, reduction in grassland quality, soil salinization, deforestation, reduction in quantity and quality of ecosystem services, and loss of biodiversity. The number of extreme events, including extreme heat, drought, flooding and storms, has doubled since the early 1990s (EM-DAT, 2018; FAO, 2018). In LAC, flooding has increased from an average 19.4 events for the period 1990-2003 to an average 27.1 for the period 2004-2017 (Figure 9).

**FIGURE 9.**  
Frequency of floods and droughts in LAC  
Source: Authors based on EM-DAT data (2018)



Floods have various causes: high intensity of rainfall; overflow of rivers; combined effect of storms and wind; and saturation of the subsoil. Urban drainage problems in the region tend to worsen as a result of greater climate variability and uncontrolled increase in impermeable areas in cities. Floods also affect agriculture and drinking water supply. Agriculture is impacted when flooding erodes the topsoil in the main crop zones, resulting in irreversible damage to the habitat (FAO, 2017). Urban flooding disproportionately affects populations living in substandard housing built in flood-prone zones or on steep gradients. Decisions on investments to mitigate the impacts of urban flooding are usually isolated, focus on grey infrastructure to send runoff downstream through conduits, culverts and canals, with insufficient articulation to land use policies and urban development planning in order to foster the adoption of preventive measures.



In addition, LAC is highly vulnerable to drought, and although droughts occur throughout the region and the number of occurrences has not changed significantly between 1990 and 2017 (Figure 9), the effects are more severe in arid lands, where 30% of the population in South America, 25% of the population in Central America and the Caribbean, and 30% of the population in Mexico live. There are critical cases such as Peru, where 40% of the territory is considered arid or semiarid and holds over 80% of the population (Magalhaes, 2018; MINAM, 2011 and 2012); Argentina and Mexico, where over 60% of the territory is classified as arid. Droughts have negative impact on the entire economy, with greater incidence on agriculture and drinking water. Smallholder farmers usually practice rainfed farming, and droughts cause long-term water scarcity and extreme temperature stress on crops, damaging yields (FAO, 2017). Lack of drinking water impacts the most vulnerable groups, characterized by women, children and the elderly.

For the period 2006-2015, worldwide damage caused by drought totaled USD 67 billion (at 2015 prices), while damage caused by flooding was USD 342 billion (IFRC, 2016). In the Americas,<sup>25</sup> economic costs were USD 41.3 billion attributable to drought and USD 56 billion attributable to flooding. Despite this high cost, the capacity for timely and efficacious planning and implementation of response is still weak. In general, the level of integration of emergency plans and construction projects for protection with basin management and urban planning is low.

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25 Including USA and Canada.

3.



# Strategy 2019-2022

CAF's water strategy is geared toward supporting countries to reach their targets and is aligned with global agreements, and national and local development plans. CAF has been supporting Latin American and the Caribbean countries by financing programs and projects contributing to water security, along with providing mechanisms for technical assistance, training and exchange of experiences.

## Alignment with CAF's Institutional Strategic Plan

**CAF's 2018-2022 Institutional Strategic Plan.** The plan highlights the need to prioritize core problems, address challenges as opportunities, and develop interventions using efficient and highly effective processes for each country. Existing poverty levels, infrastructure gaps, inefficiency of public management, low productivity and low access to water and sanitation services in rural areas remain key problems in the region.

**Scope of action and its relationship with the water sector.** CAF's Institutional Strategic Plan has five domains of action: efficiency, equity, sustainability, institutional structures, and integration, the first three of which are most closely connected with the water sector, while institutional structures are an intrinsic part of each one of them.

The *equity* domain comprises access to water and sanitation, and small-scale and family farming. The fact is water and sanitation are a human right, and the SDGs aim to achieve universal access by 2030, which calls for investments in infrastructure planning and works, stronger organizational structures with improved institutional profiles, and the creation of incentives to increase their efficiency, basic conditions for governance and the sustainability of services. Regarding family agriculture irrigation projects are targeted at improving the income of rural families, which is critical to combat poverty and inequality. In these

cases, in addition to expanding the irrigation infrastructure, technical assistance is also required to achieve capacity strengthening.

In terms of *efficiency*, the sectors and areas that will improve large infrastructure competitiveness, productivity and projects should be factored in. For the water sector, projects that will stimulate agroindustry through crop diversification will be considered, along with major multipurpose projects such as dams or aqueducts to divert water for irrigation, drinking water, power generation, flood control, aquaculture and other uses. All these projects should be structured with a suitable management of water resources in mind.

*Sustainability* is a cross-cutting domain that involves economic, social, and environmental issues. Integrated water resources management (IWRM) posits that the use of water, soil and associated resources should be coordinated in order to maximize economic and social welfare in an equitable manner, without compromising the sustainability of ecosystems. Therefore, drinking water, irrigation and environmental protection, which are uses included in the domains of equity and efficiency, are interrelated under an IWRM approach. In this regard, it is necessary to move forward in the consolidation of plans and policies that integrate water demand with water availability, along with strengthening institutional support at the different organizational levels by using effective management instruments. Disaster-risk reduction, in turn, especially risk associated with water scarcity or surplus (droughts and floods), is critical for the sustainability and preservation of ecosystems, and requires a multi-sectoral and multilevel approach, along with policies, institutional coordination and tools for effective and timely management.

**CAF believes it is essential to provide an integral response to country demands based on knowledge management that provides an added value.**

CAF's strategic approach includes a four-year application term, with a 2030 outlook, in an effort to become aligned with country commitments and the agreements reached by international finance institutions to attain the SDGs. The strategy defines goals and program lines. These will be regularly monitored and evaluated to be adjusted according to changing dynamics and contexts in the region and individual countries, paying special attention to CAF's institutional priorities.

The evaluation will include: i) a sectoral analysis to guide an ongoing dialogue about public policies and loan operations with countries and partners; ii) a conceptual and strategic reference framework for identification, formulation, assessment and monitoring activities throughout the loan cycle of investment projects; iii) technical cooperation with the water sector in line with CAF's strategic goals to support the country; and iv) best water practices.

**Selectivity of and higher efficiency in operations are goals of CAF's strategic vision for countries and clients.** CAF's criteria to support and develop its projects comprehend:

1. **Alignment.** CAF prioritizes financing by aligning countries' requests, national plans and the attainment of the SDGs.

2. **Efficiency.** CAF-supported investment projects should attain their development goals through efficient cost allocation and use of water resources. To this end, project evaluation will include a tangible assessment of a project’s capacity to be implemented and a solution prioritization that will contribute to sector development.
3. **Integrity.** CAF expects interventions to address the primary objective and that which is ultimately returned to the environment is done so under acceptable conditions.

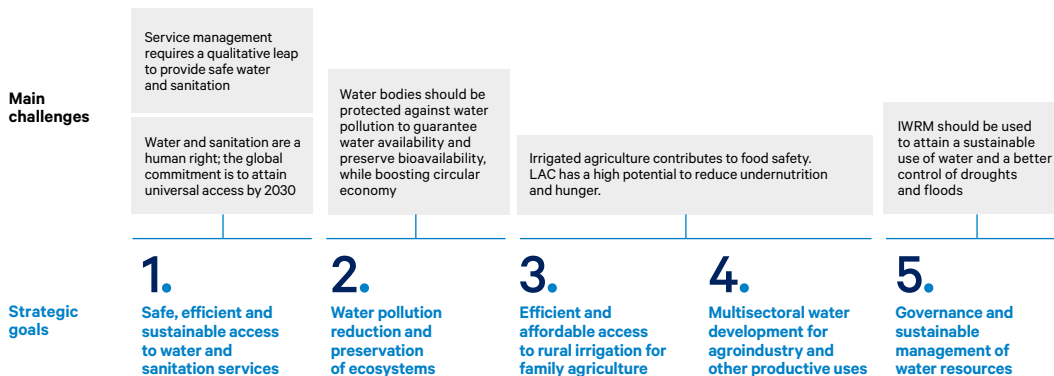
## Strategic goals and program lines

The Water Strategy’s goal is to contribute to the region’s water security, as stated below.

- Promote access to safe water and sanitation for the population, and to contribute to the productivity of countries through the efficient use of water; as well as reduce water pollution, preserve ecosystems and protect against disasters related to water scarcity or water surplus. ●●

CAF aims to ensure its water security agenda is at the core of the sectoral dialogue with countries. In this framework, the above regional challenges will be the basis for the formulation of the strategic goals, as presented in Figure 10.

**FIGURE 10.**  
Challenges and strategic goals  
Source: Authors

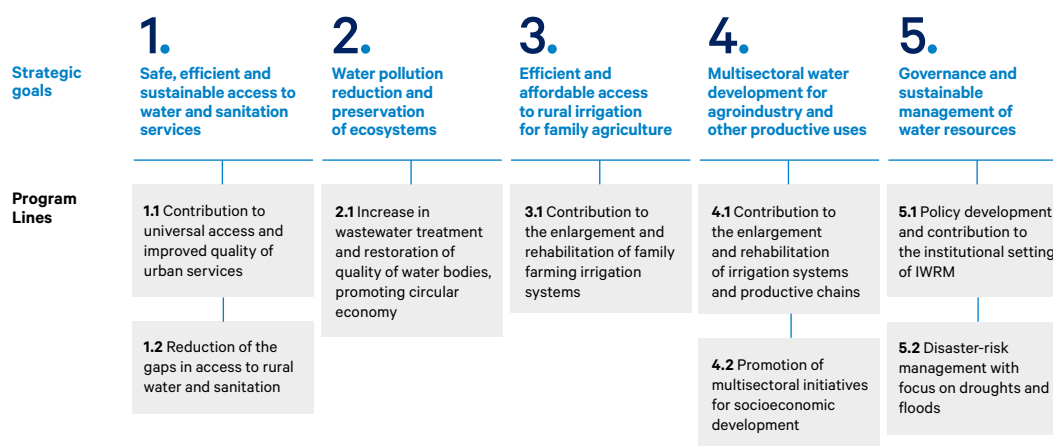


Each goal has program lines (Figure 11), which are the basis for generic and specific activities. These, in turn, expand into and are enhanced by operating activities. Investment programs or projects supported and financed by CAF can address one or more program lines, under a holistic approach.

**FIGURE 11.**

Strategic goals and program lines for the water strategy

Source: Authors



**Goal 1. Safe, efficient and sustainable access to water and sanitation services**

Attaining this goal will require strengthening support given countries at a central government or subnational level, as applicable, for the development and implementation of country programs designed to increase water and sanitation access,<sup>26</sup> consolidating each country’s legal, regulatory and management frameworks, particularly in peri-urban zones and rural territories, as a basis to reduce poverty and inequality.

...

<sup>26</sup> Sanitation is defined as the set of facilities for the risk-free elimination of excreta, including sewerage systems and on-site sanitation solutions, which is directly related to SDG target 6.2.



**Program line 1.1**  
**Contribution to universal access and improved**  
**quality of urban services**

Consistent with SDG targets 6.1 and 6.2, most countries have specific national or provincial/state sectoral plans in place designed to attain universal service provision. In the case of urban areas, it is expected that this goal will be attained before 2030. CAF will definitely support these plans. To this end, it will conduct the following actions as part of the programs or projects and technical cooperation actions to be financed:

1. Promote water access for households from an inclusive and gender equity perspective to avoid the use of unsafe water sources; minimize the round-trip time involved in collecting water, especially for children; and reduce the purchase of water from unauthorized individuals.
2. Guarantee that water is safe for human consumption using water treatment systems, reliable laboratories and quality analysis instruments that abide by international standards.
3. Ensure service availability and continuity by means of projects aligned with water security plans, involving the whole service value chain and including components that improve water distribution, such as district metered areas.
4. Improve water use efficiency in line with SDG target 6.4 through demand management programs and projects, along with technical and business actions to reduce water loss, pressure control, micro-metering, and enhance service quality, including experience in performance-based contracts and other effective modalities.
5. Promote the implementation of household connections, especially sewerage, “leaving no one behind,” by signing agreements with regulatory bodies, service providers and financial institutions. These actions will be supported by successful case studies in the region, baseline surveys and pilot cases.
6. Strengthen regulatory frameworks that foster improved management by supporting market aggregation, incentives, and management contracts and results-based financing, among other actions.
7. In line with the above, spearhead differentiated schemes to bolster service provision management by developing mechanisms and incentives to stimulate private participation—wherever feasible—consistent with country policies.
8. Improve and expand regulatory management pursuant to current and future challenges, among which are: regulation of ecosystem services, water funds and water reserves, actions to improve climate resilience, sustainable tariffs, and inclusive and equitable service expansion in peri-urban zones.
9. Reinforce the capacities and the institutional character of public agencies linked to water governance, regulation and control, both on a national and

subnational level, for the formulation of public policies, planning or processes that accompany the project cycle or knowledge management, promoting the exchange of good practices, North-South and South-South cooperation, training and other similar activities.

10. Strengthen management of water and sanitation operators to sustain their efforts to improve quality, continuity and coverage indicators over time. These actions will be supported by institutional evaluations that can identify priority areas for intervention agreed upon with each country, allowing for the implementation of different modalities by reinforcing public management or promoting private management. Capacity-building instruments may be implemented in the form of cooperation and partnerships with specialized operators; performance-based contracts for specific services; training; and the development of technical, commercial and financial guidelines, among others.
11. Develop or consolidate sub-sectoral data systems with reliable and updated data helping to pinpoint actual needs, strategic planning and service performance monitoring. CAF may support countries in the development and implementation of these systems, and in aligning systems with water and sanitation level indicators consistent with Joint Monitoring Programme criteria,<sup>27</sup> including equipment financing, training and advisory services.
12. Promote service provision innovation through digital transformation and the use of the Internet of things and big data to produce qualitative leaps in management.
13. Review technology developments that can guarantee safe water supply, including supplementary water supply options, such as desalination, especially for coastal cities suffering from water scarcity.
14. Support the elaboration of land planning, especially in metropolitan areas, in coordination with CAF's city division, allowing for the design of water and sanitation projects in peri-urban areas, and support the establishment of urban spaces for water recharge and flood control, driving nature-based solutions.

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<sup>27</sup> The Joint Monitoring Programme (JMP) sets out service ladders for drinking water, sanitation and hygiene, breaking down drinking water and sanitation into unimproved, limited, basic and safe access.



**Program line 1.2**  
**Reduction of the gaps in access**  
**to rural water and sanitation**

Dealing with a complex problem different than urban issues, this line seeks to find synergies with other sectors for a territorial impact oriented toward narrowing the service coverage gap, overcoming chronic child undernutrition and promoting gender equity. Actions to be conducted as part of operations and technical cooperation initiatives are:

1. Promote access to safe water on a gender equity basis in line with the design, construction and operation policies and criteria defined by the member state.
2. Strengthen inter-sectoral planning and coordination on a national and local level regarding the definition of investment priorities, and acceptable service and irrigation levels based on each country's development approach.
3. Foster and finance multisectoral studies and interventions under a territorial approach that address rural environments in terms of health, nutrition and education.
4. Develop studies and proposals involving alternative technologies that match the countries' rural characteristics, such as rainwater harvesting in scattered populations, the use of manual wells or fog collection, as well as low-cost filters to guarantee water quality.
5. Consolidate the sustainability of rural services through management models that foster partnership, the subsidiarity to municipal governments or other sustainable management models, aligned with the countries' development approaches and their regulatory models.
6. Make sure that water source protection and water disinfection are included in programs and projects for water systems. These interventions will be supported by the development of guidelines and sanitary education manuals, and the dissemination of gender-based hygiene habits.
7. Incentivize behavior changes in the rural population to use disinfection, pay an assessed contribution or a rate amount to cover for operational costs and the watershed approach to preserve the soil, both upstream the catchment area and downstream the catchment area or effluent discharge, among others.
8. Guarantee the incorporation of community development, the strengthening of the committee in charge of service provision and post-project support to community organizations.
9. Support in the development or consolidation of a sub-sectoral data system in the rural environment, with an intersectoral approach, that will integrate gender, health and nutrition data and indicators.

## MI AGUA Program

Bolivia has 11 million inhabitants, 33% of which live in rural areas. In early 2011, drinking water coverage in the rural areas was 51%, so that the Bolivian government applied for CAF's support to design and implement a program that: (i) was participatory and helpful to meet local demand; (ii) was not limited to the traditional criterion of setting a maximum amount per connection; (iii) incorporated social mobilization with communities and organized rural committees; and (iv) assured system operation and financial sustainability.

CAF and the government created the MiAgua program, which started from the reception of proposals sent by each municipal authority to integrate a portfolio of low-technical complexity and high-impact projects to benefit vulnerable and marginal areas across the country. Based on this and other programs, CAF has become the main partner of Bolivia in this sector, with operations worth USD 784 million in the period 2009-2017.

Progress made in terms of access to water and sanitation services in rural communities is the following: (i) one million people have access to drinking water now; (ii) more than one million people have improved frequency of supply or better quality conditions now.

Sustainability has been another achievement for community mobilization including the establishment of a gender-equity water committee, financial sustainability mechanisms, along with basic equipment and sanitary education for the population. At subsequent stages across the MiAgua project, lessons learned were incorporated as a pre-investment component to improve the quality of the designs submitted by the local authorities. In the last phase, a post-construction technical assistance component was included to train committees in better operational, business and social management aspects.

On the institutional front, a coordinating unit was created at the Ministry of the Environment and Water to monitor programs, and the National Productive and Social Investment Fund provides expertise in rural projects.

At present, phase number five of the MiAgua project is underway, and many more have been planned to help close the coverage and quality gaps. These additional phases will further tackle the reduction of child undernutrition and how to increase resilience against the effects of climate change.

## Goal 2. Water pollution reduction and preservation of ecosystems

Supported projects will include those designed to reduce the deficit of wastewater treatment coverage and service quality associated with the fulfillment of SDG target 6.3 and with the concept of safe managed sanitation, fostering recycling and reuse of treated wastewater, the use of multiple waters<sup>28</sup> and the inclusion of nature-based solutions to support fulfillment of target 6.6.

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<sup>28</sup> reused surface water, underground water, rainwater, brackish water, salty water, grey water), which can be used for different purposes and by multiple users, to cover increasing water demand.

## Panama sanitation program

Panama's Metropolitan Area comprises the districts of Panama, San Miguelito, Arraijan and La Chorrera, and is currently home to two million inhabitants. Since 2001, a sanitation project for the city and Panama Bay has been underway (first called *Proyecto de Saneamiento de la Ciudad y Bahía de Panamá [PSCBP]*, today *Programa de Saneamiento de Panamá [PSP]*). This program started by updating the sanitation master plan because of the high pollution levels in rivers and the bay. The implementation of this ambitious program was trusted to the Ministry of Health, through the program's coordination unit.

Infrastructure building in the districts of Panama and San Miguelito, and in the Panama Province (Panama-East) was initially financed by JICA, the Japanese agency for international cooperation, and the IDB, in 2006. Sewerage coverage in these areas was close to 80%. The main project components were the construction of sewerage network systems in San Miguelito, wastewater collecting systems (Lajas, Santa Rita, Cinta Costera and Matías Hernández), an 8-km interceptor wastewater tunnel and the first Juan Díaz wastewater treatment plant (WWTP) module, with a capacity of 2.2 m<sup>3</sup>/s. CAF started to support this program in 2010 to finance the completion of the interceptor tunnel and the WWTP. This phase ended successfully and the system has been in operation since May 2013.

The sanitation system continued to expand thanks to new investments in collecting systems and flow separation schemes (eastern interceptor tunnel and the Juan Díaz collecting line, among others), and the construction of the second module of the WWTP in Juan Díaz, with an additional capacity of 2.9 m<sup>3</sup>/s. In 2015, the program's intervention area was extended to include the districts of Arraijan and Chorrera (Panama-West), where sewerage coverage is just 40%. More than 400 km of sewerage networks and two WWTPs are expected to be built in these areas: Arraijan East and Caimito, which will have a joint capacity of 2 m<sup>3</sup>/s in their first stage.

The program's total investment is estimated at USD 2.2 billion since its launch in 2003. There have been seven co-financers, the main one being CAF, with eight loans for a total of USD 629 million. Seven of these loans are under execution.

As of today, the wastewater treatment service provided by the WWTP at Juan Díaz serves approximately 600,000 individuals. The works underway are expected to provide coverage for more than 1.5 million people, with the wastewater treatment in the metropolitan area reaching close to 75%. This means that the wastewater treatment capacity will be 7.1 m<sup>3</sup>/s. These systems' technology uses the biogas produced by the three WWTPs for their own energy consumption, reducing methane emissions. In addition, the operation and maintenance contracts governing the systems will remain effective for 10 years to guarantee the infrastructure's operating conditions and the suitable quality of discharges to water bodies.

The program's coordination unit has been implementing the program under a planned scheme, with updated master plans signed by Project Management Department officers who monitor the contracts under DBT or DBOT modalities (DBT: Design, Build, Transfer; DBOT: Design, Build, Operate, Transfer). The latter modality was used for the WWTPs, implemented by operators with expertise in operation and maintenance processes. The Panama sanitation program has become a state program and has survived changes in government leadership, improving the quality of life of the population and environmental conditions in Panama Bay.

**Program line 2.1**  
**Increase in wastewater treatment and restoration of**  
**quality of water bodies, promoting a circular economy**

Wastewater treatment is a pending issue in the region that has gone unaddressed for several reasons. Among them, insufficient sewerage coverage, the adoption of standards and regulations assimilated from developed countries and implemented without analyzing the investment and operational implications involved in system maintenance, and a fragile capacity for follow-up and penalization upon a repeated non-fulfillment of effluent quality standards should be factored in. Facing the challenge represented by SDG target 6.3, CAF will develop this program line guided by the actions below for programs, projects and technical cooperation initiatives:

1. Disseminate and implement an approach geared toward improving the quality of water bodies, understanding the increased wastewater treatment coverage as a means and not an end, so that investment planning in this domain is done under a watershed approach—as a water resource management unit—and circular economy, i.e., promoting the use of treated water and the recovery of by-products under the key principle that “this is not waste, these are new resources” (CAF and the World Bank, 2018).
2. Promote the planning of wastewater treatment plants in terms of prioritization criteria, according to the degree of watershed pollution, the risk of pollution of water sources and the intrinsic value of ecosystems.
3. Introduce wastewater treatment in watershed management plans, and water and sanitation master plans.
4. Strengthen standard and regulatory frameworks by introducing progressive compliance and incentive processes, along with the review, where applicable, of the permissible discharge limits and the quality targets for receiving water bodies, according to their use, and absorption and dilution capacity.
5. Support countries interested in the development of policy frameworks and bidding processes that can drive private participation in the construction and operation of wastewater treatment plants, along with the dissemination of good practices and success cases.
6. Strengthen policy and regulatory management by introducing aspects such as wastewater reuse, promote policy adjustments for the best use of the energy and biosolids produced by the treatment in coordination with CAF’s water, energy and agriculture sectors, for an integral approach with intersectoral regulation.
7. Consolidate monitoring and surveillance tasks focused on wastewater discharge, promoting water revalorization and the key concept of “those who pollute, shall pay.”
8. Develop and improve the capabilities of providers during the planning, design, monitoring, operation and maintenance phases of wastewater treatment plants.

9. Foster and introduce cost-effective technologies that suppliers can implement in programs and projects, encouraging innovation and development of environmentally respectful options, such as nature-based solutions.<sup>29</sup> This effort will be supported by guidelines for the conceptualization, selection, management and operation of wastewater treatment systems, the exchange of experiences between operators, along with the implementation of massive open online courses (MOOC) on wastewater treatment.
10. Include measures to improve society's perception about wastewater treatment, for the collective assumption of the relevant costs so that these are reflected in sanitation rates. Promote public participation in sectoral planning and investment as part of the population's awareness and involvement in decision-making processes.
11. Promote projects that can take advantage of by-products generated in the treatment process and use of multiple waters through energy generation or the use of stabilized sludge as soil conditioner, which will be strengthened with case studies. This will be consistent with the regulatory framework and the design of incentives for wastewater reuse.
12. Provide support to countries in the development of the stock and characterization of industry and mining effluents, along with regulations to govern non-household discharges to sewerage systems and avoid interference with treatment or damage to sanitary infrastructure.

### **Goal 3. Efficient and affordable access to rural irrigation for family agriculture**

Small-scale agriculture is widely disseminated in the region and is the main activity for rural families to earn their living. It is described as rain-fed agriculture and has a high potential for families to improve productivity substantially through irrigation, as explained in the previous chapter. This goal encompasses the program line below.

#### **Program line 3.1 Contribution to the enlargement and rehabilitation of family farming irrigation systems**

This is a program line in which CAF has ample experience, particularly in Bolivia, to a lesser extent in Argentina, and more recently in Peru. The proposal is to exploit and disseminate a regional concept in favor of better access to family farming that can increase income levels for vulnerable segments in rural populations and improve productivity as a basis for an integral rural development strategy.

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<sup>29</sup> Considerable progress has been achieved in the development of artificial wetlands, including for the treatment of water from industrial sources.

In this program line, CAF will support the following guiding actions for programs and projects:

1. Support the enlargement of the family irrigation surface in potential zones committed to agriculture, agreed upon jointly with agricultural and forestry authorities to guarantee a reduced impact on forests and the non-disturbance of protected areas.
2. Promote family irrigation as part of integral rural development strategies, finding synergies with other subsectors and national programs, along with an interrelation with the integrated management of watersheds and the reduction of the disaster risk associated with droughts and floods.
3. Boost irrigation technification in line with SDG target 6.4 through equipment and techniques that can drive the rational use of water and soil.
4. Facilitate the access to manure and certified seeds in infrastructure investment programs.
5. Support the development of inclusive financial mechanisms that can improve irrigation infrastructure, even at the land plot level.
6. Support the adoption of any relevant measures by providing assistance to formulate agricultural development, irrigation and watershed approach policies, plans and programs by creating incentives to technification, training and technical assistance.
7. Like in the water and sanitation subsector, strengthen the capabilities and the institutional structure of irrigation governance and regulation agencies, at a national and subnational level, in the formulation of public policies, planning, project cycles and knowledge management.
8. Strengthen the sustainability of family irrigation services by means of management models that promote partnering, in addition to establishing exchange platforms for irrigation agents committed to family farming.
9. Ensure that family irrigation interventions consider the protection of water sources and the controlled use of pesticides.
10. Boost community irrigation organizations during project execution and post-project phases, through technical assistance committed to providing legal status to organizations, making an efficient use of water and the application of irrigation, crop rotation and diversification cycles, soil erosion control, the conservation of soil humidity and the use of seeds; and improve selling practices and partnering with family farmers' associations, among others.

11. Foster training initiatives related to technification and integration with productive and supply chains for small-scale farmers, including the systematization of CAF's successful projects related to risk and family farming.
12. Conduct studies and research in coordination with CAF's knowledge areas to assess the economic impact of irrigation on agriculture and economic development.

#### **Goal 4. Multisectoral water development for agroindustry and other productive uses**

This is a privileged region in terms of water resources, with a high potential to take advantage of the vast land area suitable for irrigation. Statistics suggest that just 25% of the potential area has installed irrigation capacity and is in use, which offers an alternative for the economic diversification of the countries in the region. The program lines below have been outlined:

##### **Program line 4.1**

##### **Contribution to the enlargement and rehabilitation of irrigation systems and productive chains**

Managing demand in agriculture involves the production of higher value irrigated crops, reducing the consumptive use of water. Agricultural technification is essential to bolster productivity. CAF has gained expertise in stimulating large irrigation projects, mainly in Peru, by supporting both the public and private sectors, offering different types of loan instruments supplemented by technical assistance, and by addressing externalities that are typical in these types of projects, such as the effects of a concentration of labor. Along these lines, projects to be financed and supported by CAF will be driven by the following principles:

1. Continue to support the region's countries in the planning of irrigation for agro-industry, particularly in installed productive areas or potential areas for agriculture, under a watershed approach.
2. Finance the extension of irrigation areas in potential zones in agreement with agriculture and forestry authorities, in line with small-scale agriculture schemes.
3. Support pressurized irrigation systems through the introduction of equipment and techniques that stimulate the rational use of water and soil, in line with SDG target 6.4.
4. Support the adoption of the referred to measures by providing assistance to formulate agro-industry irrigation projects, along with the planning and design of cities that can accommodate the labor force required for these new initiatives.

5. Promote agro-industry innovation through the use of the Internet of things, big data and digital transformation, which are three tools that can generate important quality improvements for better productivity.
6. Conduct studies of agro-industry potential in selected countries in coordination with CAF's sectoral knowledge area.
7. Stimulate public-private participation in agro-industry projects.

#### Program line 4.2

#### Promotion of multisectoral initiatives for socioeconomic development

The multisectoral use of water resources provides benefits for the ensuing scale economies, which contribute to the productive, industrial and hydroelectric potential. There is increasing interest in and development of multipurpose dams for irrigation, drinking water, hydropower generation, flood control, and other purposes. Similarly, and particularly in zones affected by water scarcity, there is growing interest in the construction of desalination plants, especially for the industrial and mine sectors. Therefore, CAF will provide finance and support for multisectoral integration through the actions below:

1. Conduct studies of the countries' water potential and its impact on economic development in coordination with CAF's sectoral knowledge area.
2. In coordination with CAF's relevant areas, provide advice on the development of multipurpose projects (benefits, costs, evaluation methodologies, and other aspects) and multiannual plans that enable their implementation.
3. Promote, where applicable, public-private participation in multipurpose projects and desalination plants, including policy strengthening and intersectoral coordination.
4. Strengthen the regulatory framework for dam safety and the required institutions, supported by capacity building, the elaboration of guidelines and procedures. The exchange, cooperation and partnership between countries in the region and other highly developed countries in the matter will be promoted, along with synergies with the program line working on the reduction of the disaster risk associated with droughts and floods. CAF has spearheaded agreements in this domain between some countries in the region and Spain, which will be used as a basis for the development of regional cooperation.
5. Introduce research on multipurpose project financing<sup>30</sup> alternatives and innovation.

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<sup>30</sup> Applied both to different forms of financing and funding.



6. In multipurpose projects, promote adaptative and flexible approaches that can guarantee a watershed perspective, along with participation and consultation with stakeholders, to maximize economic, social and environmental sustainability.
7. Contribute to the economic and environmental assessment of multipurpose projects and desalination plants, in coordination with other knowledge areas in CAF, through the use of complex analysis techniques, such as multicriteria assessment, contingent valuation and hedonic prices.

### **Goal 5. Governance and sustainable management of water resources**

A watershed is a natural management unit around which the hydrological cycle is managed. It is the territory where multiple dynamic, variable and increasing uses of water are made possible, contrary to a less predictable availability subject to seasonal variations and stronger alterations resulting from climate change that impact rainfall and temperature patterns and make extreme meteorological phenomena more frequent, intense and severe. It is also the territory where extreme events originate, such as droughts and floods.

The purpose of IWRM is to establish a reference framework for the use of water to meet demand in an efficient, equitable and sustainable manner, in line with SDG targets (e.g., target 6.5). The IWRM requires water management state policies that set out clear rules and guarantee the rule of law, in addition to stable institutions that are responsive to local demands, and to implement technical and social management tools—including consultation with users—for the adoption of sensible and informed decisions.

Management tools should be selected according to the specific economic, social, political and geographic context, and comprise the use of methodologies, systems and processes, among them:<sup>31</sup> i) regulation and criteria for water allocation; ii) an analysis of risk and vulnerability (caused by droughts, water pollution or other factors); iii) modeling supply and demand scenarios; iv) water management plans;<sup>32</sup> v) communication strategies; vi) water demand management and water reuse potential assessments; and vii) mechanisms for water value and preservation.

The inadequate progress reported by the most recent monitoring report for SDG target 6.5 reflects the need to implement IWRM as an adaptative strategy. This should be supported by organizational schemes to resolve specific and local territorial needs by means of mechanisms that can turn water policies into pragmatic actions, (Smith and Clausen, 2018b), along with the policies created to tackle the water-food nexus, drought management,

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<sup>31</sup> Based on the International Water Association's toolkit.

<sup>32</sup> As needed, such as a management plan for an urban basin or a plan for adjacent basins for the management of the disaster risk.

integrated urban water management, or the protection of water sources and the natural capital. This practical application aims to improve the articulation between public and non-public actors with a genuine interest in the matter. In summary, it aims to enable better water governance, which is essential for consensus building, coordination and cooperation, including more effective financing for water resources management.

Based on the above, the program lines below have been designed.

**Program line 5.1**  
**Policy development and contribution to the**  
**institutional setting of Integrated Water Resources**  
**Management**

This program line will consolidate the policy frameworks for each country, according to specific needs and a development approach. In addition, water institutional arrangements will be improved under a multi-level approach process involving institutions and organizations, using a variety of management tools. To this end, the actions below will be put into effect:

1. Promote policies, regulations and procedures to improve integrated water resources management and water governance.
2. Strengthen multilevel institutional structures for water management, promoting transparency and accountability, gender equity and interculturalism, along with encouraging spaces for citizen participation.
3. Support and finance the development of management instruments, including watershed management plans, water funds, and methodologies to determine the value of water ecosystem services and hydrological modeling, risk analyses and demand management, among others.
4. Support and finance resilient infrastructure in view of climate change and ecosystem preservation, including nature-based solutions, along with the natural and artificial recharge of aquifers, watershed erosion control, and other issues.
5. Support countries to upgrade their regional or national hydrometeorological systems and equipment.
6. Strengthen knowledge about water availability in the region, particularly about strategic aquifers, including their characteristics, degree of exploitation and potential, water quality, among other factors.

7. Develop sectoral country strategies and analyses that orient CAF about opportunities in the regional and national contexts, particularly in countries. These strategies will include an institutional analysis, along with challenges and CAF's potential contribution according to each water strategy goal and program line.
8. Provide support for the conceptualization and development of local and international waterways, in coordination with CAF's waterway integration area.
9. Strengthen cross-border watershed and aquifer agreements and cooperation, studies, institutional structures and infrastructure projects for their use and conservation, considering that there are 69 cross-border watersheds in the region. CAF will drive, in coordination with climate funds, coordination actions between the countries about the strategic watersheds and aquifers in the region, leading to increased climatic resilience and avoidance of water conflicts.
10. Promote knowledge management between the countries through the exchange of good practices and cooperation, training and research, coupled with the development of water management tools and instruments.

This line includes the management of CAF's international water agenda, which comprises the following:

1. Intensify CAF's presence and active participation in global and regional events, sharing experiences, approaches, case studies and innovation topics in spaces such as the World Water Forum, the World Water Week, the Water Dialogues and Latinosan.
2. Develop memoranda of understanding with international or bilateral cooperation entities and internationally recognized institutions in the water sector to tackle topics aligned with CAF's water strategy.
3. Encourage cross-cutting joint interventions in programs or projects with multilateral and bilateral development banks and climate funds to catalyze resources and generate synergies.
4. Produce studies, technical notes and sectoral policy guidelines, and participate in work groups with international entities, to promote sectoral development strategies and mechanisms, including water finance and models for water management governance.
5. Promote, as applicable, private participation for service provision, using CAF's bank instruments to provide guarantees, facilitate fund leveraging and finance development projects.

Vulnerability results from a series of conditions due to physical, social, economic or environmental factors that increase the likelihood of disasters. Managing droughts and floods requires planning, and risk and vulnerability assessment, in coordination with responsive institutions and systematic processes that mitigate damage and risks to life. Facing droughts with specific policies will not only reduce vulnerability, but will also help adapt to climate change and reduce poverty, inequalities and hunger.

In line with the Sendai Framework for Disaster Risk Reduction 2015-2030, CAF will support countries in the implementation of integrated and inclusive economic, structural, legal, social, sanitary, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce the extent of exposure to disaster threats and vulnerability, increase responsiveness and reinforce resilience.

This program line includes the guiding actions for programs, projects and technical cooperation stated below:

1. Promote the construction, enlargement and rehabilitation of both traditional<sup>33</sup> and nature-based<sup>34</sup> hydraulic infrastructure.
2. Support the development of early-warning systems for urban watersheds, basic studies for their implementation, the incorporation of real-time hydrometeorological data systems and hydrodynamic monitoring of the built hydraulic infrastructure.
3. Promote the development of national strategies to reinforce national and local coordination, education and public awareness about risk disaster reduction, especially for droughts and floods, identifying synergies with climate change strategies.
4. Contribute to urban planning designed to delimit flood zones, the relocation of communities pursuant to national legal systems and laws, and the generation of water-friendly environments.<sup>35</sup>
5. Encourage the use of spatial information, including geographic information systems, and technology innovations to improve metering instruments, along with data analysis and dissemination.

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33 Dams, dikes, levees, breakwaters, and others.

34 Infiltration basins, wetlands, and others.

35 For example, the creation of green spaces in urban riverside zones.

6. Encourage the collaboration between world and regional institutions to implement instruments and tools for disaster risk reduction. Reinforce technical capacity, and consolidate assessment knowledge and methodologies to assess disaster risk, vulnerability and the degree of exposure to threats.
7. Deliver training through North-South, South-South and triangular cooperation, along with promoting alliances to take advantage of country potential.
8. Disseminate information relative to losses resulting from disasters and their economic, social and environmental impact, in coordination with CAF's knowledge areas.
9. Promote mechanisms for the implementation of disaster risk insurance, both for public and private investments, to reduce the financial consequences caused by disasters.

### **Implementation Project of the Integral Management Plan of the Lujan River Basin**

Buenos Aires Province (BAP) has over 16 million inhabitants. In the past 50 years, BAP has experienced intense rainfalls that have adversely impacted the Lujan River Basin, where 11.4% of households are considered to be poor. In recent years, floods have been covering a wider area, leading to soil saturation in urban and rural zones, reaching also routes and other communication paths.

Basin floods are caused mainly by (i) climate and meteorological factors leading to increased rainfall frequency and intensity; (ii) the physical characteristics of the river basin, such as the gradient, the contour, the soil's capacity to store water and the river runoff; and (iii) anthropogenic factors, such as changes in land-use, growing urbanization, and road and water infrastructure.

In 2016, with the national government's support, BAP asked CAF to execute a project to reduce or prevent floods, including controlling runoffs and mitigating the impact of floods on the Lujan River Basin to improve its climate resilience.

BAP structured an Integral Plan worth USD 315 million. CAF has financed USD 180 million and facilitated the participation of the French Development Agency, which has contributed USD 40 million. The integral project will cover the implementation of structural and non-structural measures. Structural measures will be related to canal expansion, bridge renovations and the creation of zones for the temporary retention of excess water, among others. Non-structural measures will include the start-up of an early warning system called SAT, for its initials in Spanish, along with actions for territorial and environmental management to administer the basin efficiently and develop territorial management frameworks suitable to meet water, environmental and socioeconomic needs. These will be conducted by a Rio Lujan Basin Committee (COMILU, for its initials in Spanish), which will be given an administrative structure and a budget to strengthen its management capacity.

The project is underway and is expected to help a population of about 2.8 million inhabitants in the basin area. The projected benefits will include avoidance of human and economic losses (caused by increasingly recurrent floods), a 36% reduction of the flood area, and protection of 340,000 basin hectares (33% of the total) thanks to the SAT system.

The above strategic goals and lines of actions will be implemented by using the instruments and tools below.

**Products and services.** CAF offers several financing products and services for the public and private sector, among them sovereign and non-sovereign loans; guarantees and loan securities; credit lines; structured financing; co-financing and refinancing; equity participation, and others. Loans are the main operational modality implemented by CAF. From this perspective, CAF has signed agreements and has partnerships with other multilateral and bilateral banks, with plans to increase the volume of its co-financing activities, along with the potential to set up joint projects with climate funds, given that climate change effects have a direct impact on water availability and quality.

**Pre-investment Program.** Portfolio reviews in connection with water operations, along with risk analyses, highlight the importance of final designs to reduce implementation timeframes, improve their quality and introduce new technologies. To this end, CAF has set up, with its own resources and by seeking the support of multiple donors, a *Pre-investment or Project Preparation Program* oriented to help countries prepare projects that can be potentially co-financed by CAF. The program aims to finance the design and pre-investment studies of water sector infrastructure projects that are consistent with CAF's strategy and have been prioritized by the region's countries. The program's resources will be used for the following activities: (i) develop final designs for the water sector, ensuring that the studies will include state-of-the-art technology, along with resilience components; (ii) advise on and prepare any required documents to conduct the project or program tender and provide support during the contracting process; (iii) conduct feasibility studies when the contracting modality is EPC; (iv) finance the supervision of studies and final designs; (v) prepare the implementation of joint financing and co-financing projects or programs with other cooperating agents; (vi) provide advice to CAF's shareholder countries on the drafting of documents to structure and request financing for an investment project or program, and on support activities that will be decisive to formulate the program or project and implement it successfully; and (vii) develop regulatory and legal proposals that contribute to make the project or program viable. Eligibility and prioritization criteria will be established in the program and supplementary documents, and in the management scheme.

**Platforms for better governance and financing.** Dialogue platforms will be promoted with CAF's authorities, researchers and officers aimed at improving the efficacy of public policies. The following has been planned:

1. A platform to improve public management's transparency and accountability through partnerships with specialized agencies.
2. A financing platform for wastewater. This is a joint CAF-World Bank regional initiative based on four pillars: technical, institutional, financial and political. CAF will focus on the financial pillar. Through a regional assessment and consultancy sessions to document case studies with public and public-private

resources, the bases will be established to create a financing platform, including efficiency and circular economy aspects. The idea is to continue turning to regional cooperation aimed at mapping the main water treatment and project prioritization needs.

3. Task Force on Financing Water for All. CAF forms part of the World Water Council's Board of Governors and participates in the TF on Financing Water for All. In this space, financing proposals and alternatives will be developed in depth, in addition to the traditional instruments.

**Specialized advice on complex projects.** To underpin the technical capacity of executing agencies, CAF will support the contracting of experts in topics in which countries and clients lack either the expertise or strong technical capacities. This support may be provided even at the initial project stages, starting at the contracting phase (development of terms of reference and tender documents). The topics will depend on each program's needs and, for example, can include: groundwater modeling, land-use plans, removal of heavy metals from water, control of diffuse pollution, nature-based solutions or dam safety.

**Knowledge documents.** Based on CAF's regional experience in project financing, the development and dissemination of the documents below will be supported:

1. Case studies and pilot projects for further scaling. For example, CAF supports a pilot project for the partnering of rural systems targeted at improving the quality of service and service sustainability based on successful experiences in Brazil.
2. Studies of applied research on new technologies for the optimization and rehabilitation of existing systems, ensuring that infrastructure is kept in operating conditions and any necessary contingency mechanisms are in place to guarantee service availability and quality. A lack of familiarity with suitable technologies can negatively impact an otherwise successful intervention and put service supply at risk. In addition to financing infrastructure expansion, CAF will support the assessment and rehabilitation of existing assets.
3. Systematization of experiences based on assessments performed during the project cycle. CAF has conducted multiple project peer reviews in the origination and formulation phases; in addition, it has performed project mid-term reviews (MTR), along with project review and closure reports (RCR) at the end of project operations. Therefore, the results and recommendations derived from peer reviews, the projects' operation manuals, MTRs and RCRs will be integrated and systematized for continuous improvement.

4. Guidelines to orient shareholder countries regarding conceptualization, good practices, and the essential aspects of project formulation. For example, in the case of wastewater treatment, these guidelines will introduce the different types of treatment, their benefits, the circular economy approach and the use of treatment by-products. These guidelines will be prioritized during the development of sector strategies or the structuring and evaluation of credit operations.
5. Guidelines for the institutional assessment of project executing agencies.

**Training.** The education and training of shareholder countries' officials will be supported under the modalities described below:

1. Specialized technical and management training delivered through regional or national events organized in selected countries, with the support of public institutions, international agencies, training centers, among others. Previous experience has been positive, arousing high interest and attracting many actors. Therefore, training events are expected to be held regularly. This experience can be replicated in other countries and cover broader topics. More training centers that provide these services can also join this initiative.
2. Online training (massive open online courses [MOOC]) that will cover high-interest topics in the region, such as dam safety, wastewater treatment, wastewater reuse and the promotion of the circular economy. CAF has already implemented several MOOCs.
3. Exchange of South-South experiences and with European countries. The aim is to help efforts for the dissemination and information about experiences by supporting the organization of exchange missions between countries.<sup>36</sup>

**Alliances with global and regional organizations.** CAF's positioning in water world events has been increasing and will continue to increase, focusing on strategic topics, such as wastewater treatment and water governance financing, along with institutional structures and management models for service sustainability.

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<sup>36</sup> For example, CAF has spearheaded the signing of a dam safety agreement between Bolivia and Spain, and between Argentina and Spain.



## Targets, monitoring and assessment

Our proposed targets are based on the rationale of a results chain. Therefore, result indicators more than product indicators are suggested, while impact indicators are expected to be progressively defined.

Based on the projects that are currently underway, and the programs and projects that are in the pipeline, CAF plans to reach the targets below in the 2019-2022 term:

- More than 11 million people in cities with new or improved access to drinking water service.
- Over 3.3 million people with new or improved access to sewerage services.
- More than 500,000 people in rural areas with safe water access and 50,000 with sanitation services.
- 4.5 million beneficiaries of wastewater treatment.
- 96,000 families with access to irrigation systems for small-scale agriculture.
- More than 3.5 million people who benefit from better planning under integrated water resources management (IWRM).
- Ten million people less vulnerable to disaster-risk due to droughts or flooding.

Targets will be monitored by a follow-up system to identify progress levels, potential delays and early-warning signs. These targets are consistent with an increased volume and number of water operations planned by CAF up to 2022, and the capabilities of the institution's team of water experts.



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